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REPORT OF COMMITTEE ON BOSTON SUBSOILS

THE purpose of this Committee is to gather data regarding the character of the subsoils in Boston and adjacent areas, and to present it to the Society in such form as to add to the general knowledge and to make it available for reference to any who may wish to get a clear idea of the geological construction of this city.

In 1914, Mr. J. R. Worcester published in the JOURNAL a treatise on "Boston Foundations," in which will be found recorded many earth borings which have been of great value.

For a number of years after that date no collection of records of borings or other investigations were made.

Many years of records were thus lost, but to carry this work on and to make use of the data collected since 1921 has been the work of this Committee.

With the hearty co-operation of the organizations making earth borings, we have been allowed to copy old records and new records soon after they were made.

The approximate number of records of borings collected to date is 3,900.

The borings have been so well scattered, and have covered areas hitherto vacant so completely, that we have been able to construct vertical sections through the city at many points.

Maps of Boston and Cambridge have been made, showing the locations of borings by groups; and the area covered by each map is indicated on a key map. Three geological cross sections (marked A, B and C) through the Boston peninsula are shown on one sheet, and three additional geological sections (marked D, E and F), two of which extend outside of the Boston peninsula, are shown on separate sheets.

No map or assembled data giving the surface elevations throughout the city was available, and to supply this need there has been made and included in this report a surface contour map of the city.

To aid the investigator in obtaining more intimate knowledge of the relation of the strata, boring data have been tabulated for each map by selecting one representative boring at each location shown on the maps. There are five tabulations, one for each map.

A schedule of these maps is as follows:

Key Map.

Maps showing location of borings:

Map 1. Boston Peninsula.

Map 2. Roxbury.

Map 3. South Boston.

Map 4. East Boston and Charlestown.

Map 5. Cambridge.

Geological sections:

Sections A, B and C.

Section D. Section from Mystic River to Dorchester Bay.

Section E. Section from Parker Hill to Chelsea Creek.

Section F. Section from Albany Street to Nashua Street.

Contour Map.

A short summary of progress since 1923 follows:

SUMMARY OF BORINGS, AND MAPS SHOWING LOCATIONS OF BORINGS

YEAR	Added	Total	Maps added
1924 . .	600	600	Boston Peninsula
1925 . .	100	700	Roxbury and South Boston
1926 . .	300	1,000	Cambridge, East Boston and Charlestown
1927 . .	1,800	2,800	— —
1928 . .	500	3,300	— —
1929 . .	325	3,625	— —
1930 . .	140	3,765	— —
1931 . .	135	3,900	— —

Aside from the collection of boring data, some study has been made of the condition in Back Bay as regards water levels.

We are still of the opinion that untreated wooden piles should be cut off not higher than +3.00 in the Back Bay district.

Just previous to the construction of the West Side Intercepting Sewer (1876 to 1878) fears were expressed that the intercepting system might considerably lower the soil-water in that district, and, by reducing it below existing pile tops, cause them to decay and so seriously endanger the supported buildings. The water level at that time was at +8.00 normally, and varied with the tides.

Experiments were carried out by producing in one of the Back Bay sewers the precise condition which would exist if the new system were constructed. It was found that the soil-water was nearly level over the whole of Back Bay district, averaging 7.7 feet above mean low water, and its height was independent of the sewers in its vicinity. Fifty-three days of pumping affected very slightly the soil-water in the vicinity of the sewer.

Since that time the Charles River Dam and the Boylston Street subway have been constructed. The Boylston Street subway has underdrains which were intended to allow free flow under it from one side to the other.

There has been, and there still is, considerable continual pumping in deep cellars having defective waterproofing, in the subway, and for various construction projects. The continual pumping, combined with changes in conditions, brought about by the construction of sewers, subway, buildings and pipe lines, is probably the cause of the present low position of the ground-water in the Back Bay district.

We found decayed pile tops under the old buildings torn down in 1920 to make room for the John Hancock Building. The water level at this site before pumping began was at +5.00 and the old piles cut off at +6.00. A large number were decayed down for a distance of 3 inches to 2 feet from the top. The piles were, presumably, entirely submerged when or shortly after they were placed.

At the Public Library, in the early part of 1929, the water level was found at +3.5 on the Library side of the Boylston Street subway, and at +6.00 on the New Old South Church side.

Following is an account of this case by J. R. Worcester & Co., who were the engineers on the work of renewing the Library foundations:

EXCERPTS FROM REPORT TO TRUSTEES OF BOSTON PUBLIC LIBRARY, 1930

In the spring of 1929 it was planned to reconstruct the terrace in front of the Library Building, and as there was some thought of increasing the dead load on the piers and walls supporting this terrace, it was considered wise to make an investigation of the piling. There were, therefore, several test pits dug at various points under the terrace to make such examination as was necessary. These pits disclosed a rather alarming condition, as the majority of piles disclosed at that time were found to be

seriously rotted at their tops. This condition led to the digging of numerous pits around the foundations of the building to determine if this condition existed under the building itself, and to what extent. These additional pits disclosed that the piling along the front of the building, and back some distance toward the interior was in a serious condition, but that toward the rear of the building the piles seemed to be in a very fair condition.

At the time of the construction of the Library, the Charles River was tidal water which had free access into the ground upon which the Library was built. This was evidenced by a rise and fall of the water in the ground corresponding to a rise and fall of the tide water in the river. From the recollections of the gentleman who was clerk of the works during the construction of the Library, the elevation of the water on the site varied from approximately Elevation +5 to Elevation +8. He further recalls that all piling was cut at Elevation +5, and that these piles were of spruce lumber. At that period treating piles with wood preservative had not come into vogue, and furthermore, it was perfectly natural to consider this treatment unnecessary owing to the fact that these piles were cut below the level of the water in the ground. Later construction, however, materially affected the ground water level, especially in the vicinity of the Library Building. To what extent this condition may exist in other localities is unknown. Undoubtedly the level of the ground water has been affected by the construction of the Boylston Street subway, deep sewers, and possibly other construction in connection with the Charles River Basin.

The decaying or rotting of the piles varied considerably in different portions of the area underpinned. The worst condition was in the vicinity of the corner of Blagden and Dartmouth streets, whereas as we worked diagonally back into the building in a northwesterly direction the condition improved considerably. Test pits under the easterly wall of the courtyard disclosed the piling to be in good condition. Very frequently we found a few piles in a group to be in fairly good condition, whereas the surrounding adjacent piling would be badly rotted. We can offer no explanation for this condition except the possible difference in condition of the lumber of the different piles when they were driven. The maximum depth below the tops of the piles to which rotting extended did not exceed 18 inches, and the condition varied all the way from a complete rotting of the entire head to merely a surface rotting extending in 1 inch or less. Some of the piles showed evidence of having been eaten by some form of a borer, but no evidence of this animal or his remains could be discovered. We are, therefore, at a loss to know just what class of borer it was that attacked these piles. It might be well to explain here that although the rotting did not extend more than 18 inches below the tops of the piles, it was considered wise to cut the piles as low as we did, namely, Elevation +1, for the purpose of insuring their heads always being wet, and also to provide sufficient room for the men to work in underneath the foundation.

The Committee has given considerable attention to soil analysis and investigation. We propose to publish more of the results of our research work on clay and subsoils in general in our next report. In this connection, we have made a machine to aid in classifying clays. This consists simply of a 6-ounce weight attached to a 5/64-inch pointed needle and mounted in such a way that penetrations of the needle into the clay may be read and the consistency of the clay determined with-

out the confusing personal factor. By bringing the clay just in contact with the point of the needle and then releasing the needle, we get a penetration of one-quarter inch for fairly hard clay and one-half inch for medium clay.

We intend to improve on this apparatus, and believe it will be a great help in doing away with the usual differences in classifications between experts when they are called upon to give opinions as to the bearing value of clay based on boring samples or samples obtained in other ways.

Following our suggestion, Mr. Kirkpatrick, of the B. F. Smith Company, has also devised and built a machine on a much more elaborate plan which gives very consistent results, so that they are able to base the classification of clays as given in the reports to their clients on the results of tests with this machine.

His machine works very smoothly, and consists of a one-quarter inch diameter round plunger which rests on the surface of the clay to be tested. An 8-ounce weight drops 18 inches on to the top of the plunger. He gets one-quarter inch penetration for hard clay and five-eighths inch penetration for medium clay, with a variation of plus or minus one-sixteenth inch. His machine is not easily portable, but, as it was designed for office use, portability is not important.

We find a great difference between blue clay in its natural bed and the same clay after being disturbed. The samples obtained by driving down a pipe (the usual method) are somewhat compressed and harder than samples of the very same clay obtained from open pit or caisson.

Near the border of old Fort Hill, just on the old shore line of Boston, were recently uncovered an ancient well and a still more ancient cannon. About 10 feet of fill covered the site which was being excavated by the Turner Construction Company. The excavation embraced an area between Franklin, Broad and Batterymarch streets, and the well was encountered just under the proposed location of a column footing on the Franklin Street side.

Old records mention several wells in this district which were used for salt water reservoirs for use in case of fire. That may have been the function of this well, as the boulder clay through, or into which, it was driven is nearly devoid of ground water, and would probably yield less than 10 gallons a day from seepage and condensation. It was laid up with stone for its entire depth, and two sections of what appeared to be an old pump were found in the débris and earth with which the well had been filled, probably for a great number of years.

As it was necessary to get down to solid, natural ground for the

column footing, the area occupied by the well was excavated to the level of the bottom of the well at El. -54.00, or about 72 feet below the level of the street. The soil at this level was a highly compacted boulder clay.

A sample of the boulder clay weighing approximately ten pounds, taken at El. -54.00, was sent to the chairman of the Boston Society of Civil Engineers Subsoils Committee. This sample was analyzed and the results tabulated in the accompanying table:

ANALYSIS OF A TEN-POUND SAMPLE OF BOULDER CLAY TAKEN AT EL. -54.00 FROM
SOUTH SIDE OF SITE BOUNDED BY BROAD, FRANKLIN AND BATTERYMARCH
STREETS

MATERIAL	Per Cent	Notes
One stone $3\frac{1}{2}'' \times 1\frac{1}{2}'' \times 1\frac{1}{2}''$	4	Felsite porphyry
Stones up to $1\frac{1}{2}''$	3	
Stones up to $1''$	4	
Gravel up to $\frac{1}{2}''$	8	
Retained on No. 10 sieve, fine gravel	5	
Retained on No. 20 sieve, fine gravel	3	
Retained on No. 40 sieve, coarse sand	4	
Retained on No. 50 sieve, coarse sand	2	
Retained on No. 80 sieve, medium sand	4	
Retained on No. 100 sieve, medium sand	2	
Retained on No. 150 sieve, fine sand	3	
Retained on No. 200 sieve, fine sand	3	
Passing No. 200 sieve, superfine sand	5	Average diameter, .032 m.m.
Passing No. 200 sieve, rock flour	5	Average diameter, .016 m.m.
Passing No. 200 sieve, superfine rock flour	2	Average diameter, .008 m.m.
Passing clay	29*	Average diameter, .002 m.m.
Moisture content	9	
Clay in suspension after 24 hours (estimated)	4	
Loss in analysis	1	
	100	

The Committee has also found it advisable to look up the old shore line of Cambridge and Boston and indicate their location on our boring location maps. A knowledge of the location of the old shore lines enables us to interpret more closely the result of our explorations, by means of borings, test pits, rod driving tests, etc.

* This portion probably consists of both superfine rock flour and clay which could be separated by further work. The color of the sample was a pale yellow to gray. The estimated weight was 128 pounds per cubic foot dry. The finer sand fractions contained considerable magnetite.

Map No. 5 is a map of a part of Cambridge lying south of Washington Street and southeast of Harvard Square. This is a district which has grown very rapidly, but originally was largely made up of marsh lands, mud and water.

After the Craigie and West Boston bridges were built, this area, commonly called East Cambridge, was rapidly filled in, and finally extended to the present limits along the Charles River Basin. By the aid of old maps and data, we made a composite map showing the original shore and marsh lines and the present street and shore lines. We believe it will be both interesting and profitable to examine this map.

Assuming the area of Cambridge (as now built) south of a line approximately through Harvard Square, Washington Street and Somerville Avenue as 100 per cent, the proportions in percentages of solid ground and of marsh land and water now filled in are about as follows:

	Per Cent
Area of solid land inside of old marsh line	52
Area of old marsh land	38
Area of old water now filled	10

The combined area of old marsh land, and old water to present-day shore line on Basin, which may be termed "made land," equals 48 per cent.

Boston proper has undergone a similar expansion of its original shore lines, and on Map No. 1 may be seen the outline of the original shore lines imposed upon the present-day city plan.

Northeast of a line running through Massachusetts Avenue, from the Charles River Basin to the South Bay flats, it is found that the old Boston peninsula is made up of about 40 per cent original solid land and 60 per cent "made" land.

The Committee has also made a study of definitions of various soils to be used for foundation purposes found in our locality, and desires to make constructive suggestions for changes in Building Law terms, as follows:

Sound Bedrock. — A solid bedrock, such as the granites and others of similar hardness and soundness, requiring blasting for their removal, and also the conglomerate known as Roxbury puddingstone which occurs at various places about Greater Boston.

Boulder Clay. — A thoroughly compacted mixture of clay, sand, gravel and boulders. A hardpan.

Hardpan Other than Boulder Clay. — A thoroughly compacted mixture of sand and pebbles with or without a mixture of boulders, but

without sufficient clay to be classed as boulder clay, and difficult to remove by picking.

Gravel. — A natural uncemented mixture of coarse or medium grained sand with a substantial amount of pebbles measuring one-fourth of an inch or more in diameter.

Sand (Compact). — Requiring picking for its removal, or which retards the circulation of water and offers decided resistance to a boring drill.

Sand (Loose). — Requiring shoveling only, or a sand that offers little resistance to a boring drill or the circulation of water.

Sand (Fine-grained). — Individual grains distinguished only with difficulty. If offering no resistance to drilling or shoveling, and containing running water, and having a tendency to rise in the boring pipe, it indicates quicksand conditions.

Silt. — Superfine rock flour and clay, measuring above 0.005 to 0.010 m.m. It may or may not contain dark organic matter, and is without any material cohesion.

In 1928 two maps were presented to the Society by the chairman of the Subsoils Committee. One map shows the contours of the boulder clay under Boston and vicinity, and the other shows the contours of the bedrock under the same area. These maps were made by Irving B. Crosby, consulting geologist, and a member of the Subsoils Committee.

Respectfully submitted,

CHAS. W. ROBINSON.
HEYWOOD S. FRENCH.
CHAS. D. KIRKPATRICK.
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HARRY E. SAWTELL, *Chairman.*

MARCH 18, 1931.

TABULATION OF BORINGS IN BOSTON AND CAMBRIDGE

The following is a compilation of data on borings made in Boston and Cambridge by owners and contractors, and assembled by the Committee on Subsoils of the Boston Society of Civil Engineers.

BORINGS INDICATED ON MAP 1

NOTE.— Figures preceded by plus or minus signs are elevations referred to Boston datum; otherwise figures are distances in feet from starting point of boring.

No.	From —	To —	Material	No.	From —	To —	Material
1	Surface 4.0 9.0 29.0	4.0 9.0 29.0 45.0	Sand, gravel fill. Mud and silt. Hard packed sand and gravel. Soft clay.		18.7 19.2	19.2 22.0	Loose silty sand and gravel. Sand and gravel.
2	Sidewalk 14.5 17.0 22.0	14.5 17.0 22.0 26.0	Sand, gravel fill. Silty sand and gravel. Silty peat. Coarse sand and gravel.	11	+13.5 14.0 20.0	14.0 20.0 28.0	Loose filling. Loose sand filling. Hard packed sand and gravel.
3	El. 15 17.5 33.0 42.0	17.5 33.0 42.0 48.0	Sand, gravel fill and peat. Sand, gravel and little clay. Firm sand and very little clay. Fairly stiff blue clay.	12	Surface 20.0 28.4	20.0 28.0 40.0	Fill. Fine silty sand and mud. Yellow clay, sand and rocks; hardpan.
4	Surface 8.0 28.0	8.0 28.0 45.0	Loose sand and gravel; probably fill. Hard packed gravel. Medium hard blue clay.	13	Surface 12.0 17.0 30.0	12.0 17.0 30.0 40.9	Loose sand and fill. Fine silty sand and mud. Hard packed coarse sand. Fine sand and little clay.
5	Surface 16.0 19.0 45.0	16.0 19.0 45.0 53.0	Fill. Sand and gravel fill. Mud and silt. Sand gravel rock.	14	Surface 23.0 28.0	23.0 28.0 38.0	Fill. Mud. Coarse sand and gravel.
6	+16.7 + 6.2 — 1.9 — 5.10	+6.2 — 1.9 — 5.10 —10.3	Sand and gravel fill. Loose coarse sand and gravel fill. Silt and fine sand. Coarse sand and gravel.	15	Cellar floor 14.2 19.5	14.2 19.5 25.0	Sand and gravel fill. Fine silty sand. Coarse sand and gravel.
7	Surface 17.0 40.0 46.0	17.0 40.0 46.0 60.0	Fill. Mud. Coarse gravel. Medium hard blue clay.	16	Surface 19.0 22.0	19.0 22.0 35.6	Fill. Mud. Sand and gravel (hard); hardpan at 35.6.
8	0 15.3 28.8	15.3 28.8 35.0	Coarse sand and gravel fill. Very soft silty sand and shells Coarse loose sand and gravel.	17	Surface 17.0 18.0	17.0 18.0 32.0	Gravel fill. Mud. Sand and gravel.
9	Surface 4.6 11.6 22.0	4.6 11.6 22.0 28.0	Fill. Mud and sand. Sand. Clay.	18	Surface 9.0 36.5 39.3	9.0 36.5 55.0	Loose medium sand fill. Silty sand and shells. Coarse dirty sand and gravel. Soft blue clay.
10	0 5.3 9.5	5.3 9.5 18.7	Sand, gravel fill. Fine silt sand. Silt.	19	Surface 8.9 29.0 38.0	8.9 29.0 38.0 50.0	Fill. Mud. Hard clay. Hard clay.
				20	0 20.5	20.5 43.3	Miscellaneous fill. Soft silt, little sand and shells.

BORINGS INDICATED ON MAP 1 — *Continued*

No.	From —	To —	Material	No.	From —	To —	Material
	43.3	46.0	Coarse sand and gravel.	35	+27.7	+2.0	Sand and gravel fill.
	46.0	65.0	Soft blue clay.		+2.0	-22.0	Silt.
21	Surface	5.0	Fill.		-22.0	-27.3	Hard blue clay.
	5.0	14.9	Mud.	36	Surface	21.0	Loose sand and gravel filling.
	14.9	26.0	Sand and gravel (hard).		21.0	42.0	Soft dock mud.
	26.0	34.0	Coarse sand.		42.0	44.0	Clay.
	34.0	50.0	Medium clay.		44.0	60.0	Tough blue clay.
22	Surface	11.0	Fill.	37	0	7.5	Loamy sand.
	11.0	17.0	Mud.		7.5	24.5	Fine sand and gravel fill.
	17.0	31.10	Sand.		24.5	43.2	Silt, fine sand and shells.
	31.10	40.0	Hard clay.		43.5	48.5	Hard sand and gravel.
	40.0	55.0	Soft clay.	38	Surface	14.0	Filling.
23	+18.0	0	Space.		14.0	34.0	Fine silty sand and mud.
	0	-8.8	Sand and gravel fill.		34.0	50.0	Hard blue clay (?).
	-8.8	-21.5	Silt.	39	0	2.0	Loam.
	-21.5	-26.0	Very hard sand and gravel.		2.0	9.0	Sand and gravel fill.
24	Cellar floor	6.0	Sand.		9.0	11.0	Fine sharp sand fill.
	6.0	11.0	Sand and gravel.		11.0	15.0	Sand and gravel fill.
	11.0	15.0	Mud and sand.		15.0	19.5	Silt and very fine sand.
	15.0	39.0	Sand.		19.5	25.0	Fine sand and silt.
	39.0	50.0	Clay.		25.0	30.0	Peaty silt and shells.
25	Surface	19.6	Filling.		30.0	33.5	Stiff blue clay.
	19.6	27.0	Dock mud.		33.5	40.0	Stiff yellow clay.
	27.0	40.0	Hard packed sand and gravel.	40	Surface	19.0	Sand, gravel and old wood fill.
26	Surface	29.0	Sand filling.		19.0	23.0	Coarse sand and gravel fill.
	29.0	38.0	Mud.		23.0	37.0	Mud.
	38.0	44.0	Sand and gravel.		37.0	51.0	Blue clay.
27	Surface	16.0	Sand and gravel fill.	41	Surface	20.0	Fill.
	16.0	40.0	Fine sand.		20.0	28.0	Fine silty sand and mud.
28	Surface	11.4	Hard filling.		28.0	40.0	Clay, sand, rocks; hardpan.
	11.4	26.0	Hard packed sand, gravel and rocks.	42	Surface	14.6	Fill.
29	Surface	5.0	Fill.		14.6	17.0	Mud.
	5.0	12.0	Soft mud.		17.0	22.0	Clay and sand.
	12.0	29.6	Rocks and gravel (hard).		22.6	32.0	Clay.
30	Surface	8.0	Fill.	43	-2.0	-22.0	Silt.
	8.0	15.0	Mud.		-22.0	-37.0	Medium clay.
	15.0	25.0	Hard packed sand and gravel.		-37.0	-52.0	Fine sand.
31	Grade	15.0	Starting point.		-52.0	-67.0	Medium clay.
	15.0	7.11	Sand.		-67.0	-77.0	Medium clay.
	7.11	17.11	Sand, gravel and rocks.		-77.0	-82.0	Medium clay.
	17.11	25.9			-82.0	-102.0	Stiff clay and gravel.
32	Surface	28.3	Fill.	44*	-	-	-
	28.3	31.7	Compressed mud.	45	Surface	11.7	Filling.
	31.7	37.8	Fine compact sand.		11.7	14.0	Mud.
33	Surface	19.0	Sand and gravel fill.		14.0	16.0	Fine sand.
	19.0	35.7	Mud.		16.0	29.0	Mud.
	35.7	47.0	Blue clay.		29.0	34.0	Clay.
34	Starting point	18.6	Gravel filling.		34.0	66.4	Fine sand.
	18.6	41.0	Dock mud.	46	Basement floor	9.0	Fill.
	41.0	46.0	Blue clay.		9.0	14.0	Hard yellow clay.
					14.0	40.0	Very fine sand; traces of clay.
					40.0	61.0	Soft blue clay.

* Missing.

BORINGS INDICATED ON MAP 1 — *Continued*

No.	From —	To —	Material	No.	From —	To —	Material
47	12.4	— 7.5	Loose sand and gravel fill.	58	5 below surface	15.0	Fill.
	— 7.5	— 23.1	Soft sand, silt and shells.		15.0	20.0	Mud.
	— 23.1	— 31.5	Stiff blue clay.		15.0	23.0	Sand and gravel.
	— 31.5	— 38.5	Rather soft blue clay.		23.0	29.0	Clay and rocks.
	— 38.5	— 42.4	Blue clay, sand and gravel.	59	Sidewalk	7.7	Space.
	— 42.4	— 88.0	Medium blue clay.		7.7	10.0	Fill.
48	Surface	20.0	Fill.		10.0	12.9	Silt.
	20.0	41.0	Dock mud.		12.9	17.7	Stiff blue clay.
	41.0	50.0	Hard blue clay.	60	0	10.2	Basement.
49	Surface	14.0	Fill.		10.2	17.8	Sand, gravel and little clay fill.
	14.0	22.0	Mud and sand.		17.8	27.4	Silt.
	22.0	29.0	Fine sand.		27.4	28.6	Stiff clay and gravel.
	29.0	47.0	Hard clay.		28.6	36.2	Stiff yellow clay.
50	Surface	16.0	Filling.	61	Surface of floor	6.5	Mud.
	16.0	24.0	Clay and fine sand.		6.5	8.3	Fill.
	24.0	48.0	Medium blue clay.		8.3	10.6	Mud and filling.
51	0	9.0	Sand and gravel fill.		10.6	39.8	Silt.
	9.0	14.0	Hard yellow clay.		39.8	49.11	Hard clay.
	14.0	40.0	Fine sand and little clay.	62	0	16.3	Fill.
	40.0	61.0	Soft blue clay.		16.3	18.5	Silty sand and shells.
52	Street	13.0	Fill.		18.5	24.0	Hard yellow sand, little gravel and clay.
	13.0	30.3	Mud.	63	Basement level	16.0	Fill.
	30.3	35.3	Gray sand and clay.		16.0	25.0	Hardpan.
	35.3	52.0	Yellow sand and clay.	64	+19.0	+10.5	Fill.
53	Surface	15.6	Fill.		+10.5	— 1.5	Clay, sand and gravel fill.
	15.6	37.0	Mud.		— 1.5	— 10.5	Silt, fine sand and shells.
	37.0	41.0	Gravel, rocks.		— 10.5	— 11.5	Soft blue clay.
54	Starting point	23.0	Fill.		— 11.5	— 16.0	Medium blue clay.
	23.0	37.0	Soft mud with little sand.	65	0	15.5	Cinder fill.
	37.0	45.0	Rocks and gravel, very hard.		15.5	18.5	Silty sand and gravel fill.
55	Bottom hole	5.0	Fill.		18.5	31.5	Soft silt and very little very fine sand.
	5.0	21.0	Soft peat mud.		31.5	32.5	Silty peat.
	21.0	33.0	Soft dock mud.		32.5	34.5	Hard silty sand.
	33.0	40.0	Coarse sand and gravel.		34.5	38.5	Hard blue clay.
56	0	15.3	Fill.	66	Surface	24.9	Fill.
	15.3	18.0	Soft black silt and sand.		24.9	32.8	Mud.
	18.0	22.8	Black silt and little very fine sand.		32.8	35.0	Soft clay.
	22.8	27.0	Silt and fine sand.		35.0	52.0	Soft clay.
	27.0	34.8	Soft silt and very little fine sand.	67	Surface	24.0	Fill.
	34.8	39.6	Silty peat and little very fine sand.		24.0	39.0	Mud.
	39.6	40.5	Rather loose sand, gravel and little peat.		39.0	60.0	Hard clay.
	40.5	42.7	Firm sand, gravel and little clay.	68	Surface	17.7	Fill.
	42.7	46.0	Stiff blue clay, very little fine sand.		17.7	25.0	Fill.
57	Surface	16.0	Fill.		25.0	30.0	Old wood fill.
	16.0	22.0	Peat mud.		30.0	34.0	Clay and rocks.
	22.0	67.0	Sand and mud.		34.0	43.9	Hard clay.
	67.0	72.0	Clay and gravel.	69	Surface	15.0	Fill.
					15.0	34.0	Dock mud.
					34.0	37.0	Hard clay.
				70	Surface	9.0	Sand, rocks, mud.
					9.0	21.0	Hard clay.
					21.0	24.0	Sand, gravel, clay.

BORINGS INDICATED ON MAP 1 — *Continued*

No.	From —	To —	Material	No.	From —	To —	Material
71*	—	—	— —	85	Surface	10.0	Old wood and fill.
72	Sidewalk	10.0	Fill.		10.0	23.0	Soft clay.
	10.0	36.0	Clay and sand mixed.		23.0	35.0	Hard clay.
	36.0	52.0	Rocks, sand, clay mixed.	86a	0	4.2	Fill.
					4.2	14.7	Silt.
73	+73.93=0	8.5	Hard yellow sand and little clay.		14.7	20.0	Hard blue clay.
	8.5	9.5	Hard yellow clay and little sand.	86b	0	3.5	Fill.
	9.5	11.5	Hard yellow sand and little clay.		3.5	13.2	Peat.
	11.5	13.3	Hard sand gravel and clay.		13.2	20.0	Hard blue clay.
	13.3	24.5	Hard clay and little fine sand.	87	5.5 below sidewalk	6.3	Fill.
	24.5	26.5	Hard sand gravel; hardpan.		6.3	24.6	Silt.
					24.6	25.2	Peat.
					25.2	29.0	Stiff blue clay, little sand.
74	Grade to	20.0	Fine sand.	88	Surface	10.0	Fill.
	20.0	38.0	Sand.		10.0	24.10	Old wood mud, fill.
	38.0	41.0	Hard clay.		24.10	37.10	Fine silty sand and mud.
75	Surface	11.3	Hard compact gravel and rocks.		37.10	50.0	Hard blue clay.
	11.3	30.8	Coarse sand, gravel and some clay.	89	0	9.5	Sand and gravel fill.
					9.5	18.0	Clay and silt fill.
76	Surface	4.9	Fill.		18.0	41.0	Silty sand and shells.
	4.9	6.4	Mud and sand.		41.0	43.4	Silty sand and gravel.
	6.4	13.6	Mud.		43.4	47.0	Hard sand and gravel.
	13.6	15.4	Clay and sand.	90	0	5.0	Sand and gravel and brick fill.
	15.4	29.6	Soft blue slaterock.		5.0	45.5	Silt and little fine sand and shells.
77	Sidewalk	7.5	Fill.		45.5	49.0	Sand and little fine gravel, little silt.
	— 5.0	15.5	Mud.		49.0	55.0	Soft blue clay.
	7.5	33.0	Sand and gravel.	91	Surface	14.0	Fill.
78	0	1.0	Fill.		14.0	29.0	Dock mud with little sand.
	1.0	23.3	Firm yellow sand, very little clay.		29.0	42.0	Hard blue clay.
	23.3	30.0	Firm blue sand.	92	Surface	10.0	Fill.
79	Cellar floor	10.6	Fill.		10.0	38.0	Soft mud.
	10.6	14.0	Clay.		38.0	42.0	Blue clay.
	14.0	16.0	Fine sand.	93	Surface	6.6	Mud and fill.
	16.0	27.0	Blue clay.		6.6	21.0	Hard clay.
80	Surface	8.0	Fill.	94	Surface	12.0	Mud.
	8.0	19.0	Loose sand.		12.0	41.0	Blue clay.
	19.0	22.6	Sand and gravel.		41.0	50.0	Clay and rocks.
	22.6	44.0	Dock mud.		50.0	57.0	Soft slate rock.
	44.0	57.0	Hard blue clay.	95	Bottom trench	4.2	Stiff clay.
81	Surface	20.0	Fill.		4.2	25.0	Clay and rocks; hardpan.
	20.0	40.0	Dock mud.	96	Surface	8.0	Fill.
	40.0	55.0	Hard blue clay.		8.0	15.0	Fine silty sand.
82	Bottom pit	8.0	Fill.		15.0	20.0	Coarse sand.
	8.0	23.0	Mud.		20.0	30.0	Hard blue clay.
	23.0	40.0	Hard clay.	97	—13.7	—20.9	Silty sand.
83	0	13.0	Fill.		—20.9	—32.2	Hard yellow clay.
	13.0	26.5	Mud.		—32.2	—43.7	Medium blue clay.
	26.5	40.0	Hard clay.	98	Surface	2.0	Brick and mortar fill.
84	Surface	12.0	Fill.		2.0	20.0	Hard clay and rocks.
	12.0	19.0	Mud.				
	19.0	29.0	Clay and rocks.				

* Missing.

BORINGS INDICATED ON MAP 1—*Continued*

No.	From —	To —	Material	No.	From —	To —	Material
99	Starting point	16.2	Sand, ashes, rocks, fill.		16.2	19.5	Fine sand and little gravel.
	16.2	29.6	Hard packed sand.		19.5	23.5	Loose sand, clay and fine sand.
	29.6	36.6	Sand and clay.		23.5	34.7	Medium blue clay and sand.
100	-15.5	-20.0	Soft mud.		34.7	40.0	Hard sand, gravel, very little clay.
	-20.0	-41.5	Coarse sand and gravel.	114*	-	-	-
	-41.5	-55.5	Hard, coarse sand, gravel, little clay.	115	0	2.0	Fill.
101	-24.0	-26.5	Silty sand.		2.0	7.0	Sand and gravel.
	-26.5	-29.5	Fine blue sand.		7.0	10.7	Coarse sand.
	-29.5	-32.0	Medium yellow clay.		10.7	24.7	Hard fine dry sand, coarse gravel.
	-32.0	-34.5	Medium blue clay.		24.7	35.6	Dry cemented sand, clay, and little gravel; hardpan.
	-34.5	-53.5	Medium yellow clay.		35.6	44.0	Hard coarse sand, coarse gravel, little clay.
	-53.5	-74.0	Soft blue clay.		44.0	49.3	Cemented sand, gravel, clay.
102	-	-	Filling, clay, stones.				
103	0	13.2	Sand and gravel fill.				
	13.2	19.5	Silt.				
	19.5	24.7	Silty sand.				
	24.7	30.0	Hard yellow clay.				
104	Surface	9.0	Fill.	116	Bottom cellar	9.0	Fill.
	9.0	40.0	Hard clay and rocks.		9.0	22.0	Stiff clay.
105	0	18.0	Fill, sand, bricks, etc.		22.0	58.0	Soft clay.
	18.0	30.0	Blue clay.		58.0	68.0	Gray sand with little clay.
	30.0	35.0	Blue clay.				
106	0	22.8	Fill.	117	0	6.3	Fill.
	22.8	33.0	Clay.		6.3	15.0	Hard.
	33.0	49.6	Clay, sand and rocks.		15.0	32.0	Medium blue clay.
107	0	5.6	Fill.	118	Basement floor	11.6	Sand and mud.
	5.6	11.0	Mud and old wood.		11.6	13.4	Clay.
	11.0	26.0	Clay and gravel.				
108	Surface	22.0	Old wood, mud and filling.	119	Surface	17.0	Fill and mud.
	22.0	24.0	Clay, sand and rocks.		17.0	25.0	Hard clay.
	24.0	32.0	Hard clay.		25.0	60.0	Medium hard clay.
109	Surface	11.0	Clay and rock fill.	120	0	11.5	Fill.
	11.0	25.0	Ashes and old wood fill.		11.5	14.5	Silt and very fine sand.
	25.0	38.0	Coarse gravel; struck rock.		14.5	17.2	Silt, sand and coarse gravel.
					17.2	21.0	Hard yellow clay.
					21.0	26.0	Stiff yellow clay.
110	Surface	17.0	Fill.	121	Bottom of pit	9.0	Mud.
	17.0	40.0	Clay and small stones mixed.		9.0	50.0	Clay.
111	Surface	20.0	Fill.		50.0	68.0	Clay and sand.
	20.0	25.0	Blue clay.		68.0	92.0	Clay on ledge.
112	0	5.8	Concrete 1 foot, sand and gravel, 4.8.	122	0	16.0	Mud (silt).
	5.8	7.0	Wood.		16.0	35.0	Hard clay, little fine sand.
	7.0	8.3	Silt and gravel.		35.0	50.0	Medium blue clay.
	8.3	15.0	Medium yellow clay, little fine sand.	123	Basement floor	16.0	Mud.
	15.0	18.2	Medium blue clay.		16.0	35.0	Hard clay and little fine sand.
	18.2	22.5	Compact sharp sand, little clay.		35.0	50.0	Medium blue clay.
	22.5	25.0	Medium blue clay.				
113	0	6.2	Fill.	124	Surface	16.0	Fill.
	6.2	9.7	Peat.		16.0	29.6	Mud and sand.
	9.7	16.2	Soft blue clay and fine sand.		29.6	37.0	Hard yellow clay.

* Missing.

BORINGS INDICATED ON MAP 1 — *Continued*

No.	From —	To —	Material	No.	From —	To —	Material
125	Basement area 6.0 27.0 34.0	6.0 27.0 34.0 50.0	Fill. Hard clay and rocks. Hard yellow clay. Medium blue clay.		27.7 30.0	30.0 35.0	Firm sand, gravel and little clay. Hard clay, sand and gravel.
126	+ 7.5 - 4.7 - 12.7 - 19.5	- 4.7 - 12.7 - 19.5 - 47.5	Fill. Dock mud. Hard yellow clay. Medium hard blue clay.	138	- 8.79 - 26.79 - 59.29	- 26.79 - 59.29 - 60.29	Mud. Soft blue clay. Sand and gravel; struck rock at - 60.29.
127	Surface 19.0 36.9	19.0 36.9 50.0	Fill. Dock mud. Hard blue clay.	139	- 28.0 - 35.6 - 39.0	- 35.6 - 29.0 - 49.0	Sand and gravel fill. Fine silty sand. Very stiff blue clay.
128	El. + 14.0 - 8.0 - 15.0	- 8.0 - 15.0 - 34.0	Clay and stone fill. Dock mud. Hard blue clay.	140	- 28.0 - 35.6 - 39.0	- 35.6 - 39.0 - 49.0	Sand and gravel fill. Fine silty sand. Very stiff blue clay.
129	0 13.0 17.0 23.5 34.0 35.3 42.5	13.0 17.0 23.5 34.0 35.3 42.5 57.0	Space and water. Soft silt. Silt and little fine sand. Soft silt, fine sand. Peat. Stiff blue clay. Soft to stiff blue clay.	141	Surface 14.0 25.0	14.0 25.0 40.0	Fill. Sand and gravel fill. Hard blue clay.
				142	+ 20.0 + 8.0	+ 8.0 - 4.0	Fill. Fine silty sand and mud and old timbers. Hard clay (yellow).
130	Surface	32.0	Soft fill; dock mud and sand.	143	Bottom of cellar 15.0 28.7	15.0 28.7 45.0	Fill. Mud. Hard clay.
131	0 11.5 30.5 31.5	11.5 30.5 31.5 43.0	Fill. Silt, fine sand and shells. Soft blue clay. Medium clay, blue and yellow.	144	Surface 7.0 12.0	7.0 12.0 25.0	Fill. Mud. Hard clay.
132*	-	-	-	145	0 1.0	1.0 7.6	Fill. Hard clay and fine yellow sand.
133	Bottom of pit 7.0 9.0 18.0	7.0 9.0 18.0 45.0	Fill. Mud. Clay and rocks. Medium hard blue clay.		7.6 25.7 29.3 40.0	25.7 29.3 40.0 45.0	Fine medium coarse sand. Medium blue clay. Fine blue sand, very little clay. Medium blue clay.
134	0 1.0 10.0 17.58	1.0 10.0 17.58 25.0	Fill. Hard blue clay. Medium blue clay. Hard sand and gravel, very little clay.	146	Surface 4.0 7.0 31.0	4.0 7.0 31.0 45.0	Clay. Coarse sand. Clay. Fine sand.
135	0 1.5 5.5 7.66 11.5 17.75	1.5 5.5 7.66 11.5 17.75 20.0	Concrete. Hard yellow clay. Medium blue clay. Medium blue clay, little fine sand. Medium blue clay. Firm clay and gravel.	147	0 2.0 8.2	2.0 8.2 40.0	Sand and gravel. Stiff clay, little gravel. Fine sand, very little clay.
				148a	El. + 48.5 + 46.5	+ 46.5 + 30.0	Fill. Clay, sand and gravel; hardpan.
				148b	El. + 39.5 + 38.0	+ 38.0 + 31.5	Fill. Clay, sand and gravel; hardpan.
136	Surface 9.9 17.8	9.9 17.8 33.0	Fill, hard. Old wood, mostly. Clay and rocks, hard.	149	Basement floor 2.0 9.0 20.0	2.0 9.0 20.0 30.0	Fill. Hard yellow clay. Medium soft blue clay. Soft blue clay with streaks of sand.
137	5.0 below sidewalk 0 21.5 25.0	21.5 25.0 27.7	Miscellaneous fill. Silt and gravel fill. Black silt.				

* Missing.

BORINGS INDICATED ON MAP 1—*Continued*

No.	From—	To—	Material	No.	From—	To—	Material
150	Cellar floor 3.0 15.0 19.0	3.0 15.0 19.0 25.0	Clay and sand. Clay. Blue clay. Rocks, gravel and clay.	158	0 9.0 13.2 19.5 31.0	9.0 13.2 19.5 31.0 39.0	Sand, little gravel and clay. Hard sand, clay and gravel. Hard yellow clay. Medium blue clay. Compact fine sand.
151	Surface 5.0 15.0	5.0 15.0 20.0	Clay. Blue clay. Clay and rocks.	159	Surface 19.6 39.6	19.6 39.6 50.0	Sand and gravel fill. Mud and sand. Clay.
152	Cellar floor 6.8 14.8 27.9 36.4	6.8 14.8 27.9 36.4 46.6	Clay. Sand and clay. Sand and clay. Blue clay. Clay and rocks; hardpan.	160	+13.5 +3.8 +.5	+3.8 +.5 -11.5	Fill. Silt and fine sand. Hard blue clay.
153	0 1.5 16.2 18.4 20.2 28.7 41.0	1.5 16.2 18.4 20.2 28.7 41.0 43.0	Fill. Hard blue clay. Medium blue clay, little fine sand. Medium blue clay. Fine blue sand. Medium blue clay. Blue clay, little sand and gravel.	160a	+7.7 +1.0 +.5	+1.0 -.5 -11.3	Fill. Silty sand. Hard clay.
154	+18.0 — 17.0 21.0	17.0 17.0 21.0 48.0	Fill. Water level. Flowing sand. Medium blue clay.	161	Bottom cellar 4.9	4.9 6.6	Mud and sand fill. Hard clay.
155	+26.5=0 7.5 19.0 25.3 25.3 31.5 36.5 45.2 49.5 57.7 88.1	7.5 19.0 25.3 31.5 36.5 45.2 49.5 57.7 88.1 92.5	Fill. Hard yellow clay, little fine sand. Medium yellow clay and fine sand. Fine sand and little clay. Medium blue clay. Fine sand and very little clay. Soft blue clay, fine sand. Fine sharp sand. Soft blue clay. Hard sand, gravel, little clay, rock or boulder.	162	Surface 11.0 17.0	11.0 17.0 30.0	Fill. Hard yellow clay and rocks. Hard blue clay.
156	0 7.2 22.5 22.5 27.2 29.5 36.5 42.0 42.0	7.2 22.5 27.2 29.5 36.5 42.0 55.0	Fill. Hard yellow clay, little fine sand. Medium blue clay. Fine sand. Medium blue clay. Fine sand, very little clay. Medium blue clay.	163	Surface 18.0	18.0 38.0	Fill. Clay.
157	El. 25.95=0 4.2 9.7 21.2 25.0 25.0 28.6 33.5 33.5 42.2	4.2 9.7 21.2 25.0 28.6 33.5 42.2 50.0	Sand and gravel. Hard clay, gravel and sand. Hard yellow clay. Blue clay, little fine sand. Hard yellow clay. Fine yellow sand. Fine gray sand. Soft blue clay.	164	+21.0 6.0 17.2 19.3 21.5 21.5 23.0	6.0 17.2 19.3 21.5 23.0 30.0	Concrete. Sand and fill. Wood, mud and fill. Medium clay, little sand. Sand, gravel and clay. Medium clay.
158	0 9.0 13.2 19.5 31.0	9.0 13.2 19.5 31.0 39.0	Sand, little gravel and clay. Hard sand, clay and gravel. Hard yellow clay. Medium blue clay. Compact fine sand.	165	Surface 14.0 17.0	14.0 17.0 30.0	Filling. Peat, mud. Hard clay.
159	Surface 19.6 39.6	19.6 39.6 50.0	Sand and gravel fill. Mud and sand. Clay.	166	Cellar bottom 7.0 19.7	7.0 19.7 50.0	Loose fill. Mud and fill mixed. Soft blue clay.
160	+13.5 +3.8 +.5	+3.8 +.5 -11.5	Fill. Silt and fine sand. Hard blue clay.	167	Surface 7.0 13.6	7.0 13.6 25.0	Fill. Mud. Clay.
160a	+7.7 +1.0 +.5	+1.0 -.5 -11.3	Fill. Silty sand. Hard clay.	168	Bottom cellar 13.7 13.7	13.7 22.0 51.0	Hard yellow clay. Blue clay mixed with little sand. Blue clay mixed with little sand.
161	Bottom cellar 4.9	4.9 6.6	Mud and sand fill. Hard clay.	169	Sidewalk 12.0 18.0	12.0 18.0 40.0	Fill. Hard clay. Stiff blue clay.
162	Surface 11.0 17.0	11.0 17.0 30.0	Fill. Hard yellow clay and rocks. Hard blue clay.	170	0 1.0 4.5 20.0 30.5	1.0 4.5 20.0 30.5 40.0	Fill. Hard yellow clay, little fine sand. Medium blue clay. Fine compact sand little clay. Medium blue clay.

BORINGS INDICATED ON MAP 1 — *Continued*

No.	From —	To —	Material	No.	From —	To —	Material
171	Bottom fill 42.0	42.0 45.0	Clay. Sand and rocks.	188	Bottom cellar 15.0	15.0 22.0	Mud. Hard sand and clay mixed.
172	0 8.0 47.0 48.5 54.0	8.0 47.0 48.5 54.0 58.0	Fill. Medium blue clay. Fine sand, little clay. Medium blue clay. Compact sharp sand.		22.0	29.0	Hard clay.
173	Bottom cellar 7.2	7.2 15.0	Fill. Clay.	189	Surface 7.0 15.0	7.0 15.0 30.0	Filling. Mud. Stiff clay.
174	Surface 5.0 9.0 30.0	5.0 9.0 30.0 40.0	Fill. Clay and sand. Clay. Fine sand.	190	Surface 12.0 25.0	12.0 25.0 40.0	Fill. Fine sand and mud. Blue clay.
175	0 8.0 16.7	8.0 16.7 37.7	Fill. Mud. Hard blue clay.	191	Surface 14.0 26.0	14.0 26.0 38.0	Fill. Fine sand and mud. Hard clay.
176	Surface 17.6	17.6 40.0	Fill, mud, old wood. Hard blue clay.	192	River bed 28.0	28.0 35.0	Dock mud. Hard blue clay.
177	Grade 15.7 8.0 23.5	8.0 23.5 29.0	Fill. Mud. Hard clay.	193	Surface 14.0 28.0 40.0	14.0 28.0 40.0 50.0	Fill. Soft clay and sand. Soft clay and sand. Stiff clay.
178	0 8.5 16.0	8.5 16.0 26.0	Fill. Mud. Hard clay.	194	Surface 20.0 40.0	20.0 40.0 50.0	Fill. Mud. Clay.
179	0 5.2 18.8 20.2	5.2 18.8 20.2 27.2	Fill. Mud (silt). Medium blue clay. Hard yellow clay.	195	Surface 19.0 40.0	19.0 40.0 48.0	Loose fill. Mud. Hard clay.
180	0 13.0 18.5 31.0	13.0 18.5 31.0 58.0	Space and water. Silt and sand. Hard yellow clay. Stiff blue clay.	196	Start 22.3	22.3 27.0	Medium blue clay. Hard clay and little fine sand.
181	Surface 9.0 29.0	9.0 29.0 42.0	Fill. Mud. Clay.	197	+18.0 +17.3 +14.5 +11.3 +10.3	+17.3 +14.5 +11.3 +10.3 - 2.2	Paving. Sand and gravel fill. Hard yellow clay. Sand, gravel and clay. Hard clay.
182	10.8 below surface = start 15.0 15.9	15.0 15.9 20.0	Silt and shells. Silty peat. Very stiff blue clay.	198	Surface 7.6 26.0	7.6 26.0 65.0	Filling. Peat, mud. Medium hard clay.
183	6 below sidewalk 12.5 30.5	12.5 30.5 40.0	Fill. Silt. Hard blue clay.	199	Starting point 21.0 33.9	21.0 33.9 39.6	Rocks and fill. Mud. Clay.
184	Surface 11.0 26.0	11.0 26.0 37.0	Fill. Mud. Clay.	200	Surface 10.0 16.3	10.0 16.3 40.0	Fill. Peat, mud. Hard clay.
185	10.0	21.8	Clay, sand, rocks, gravel.	201	Surface 11.0 22.0	11.0 22.0 30.0	Filling. Peat, mud. Blue clay.
186	Top of well 17.0 28.0	17.0 28.0 31.6	Water. Soft mud. Hard clay.	202	Surface 9.0 16.10 20.0 24.4	9.0 16.10 20.0 24.4 58.0	Fill. Mud (soft). Loose sand. Soft mud. Hard clay.
187	Surface 3.0 18.0	3.0 18.0 34.0	Clay and rocks. Hard clay. Medium clay.	203*	—	—	—
				204	Surface 10.0 25.0	10.0 25.0 40.0	Fill (gravel and mis- cellaneous). Dock mud. Hard yellow clay.

* Missing.

BORINGS INDICATED ON MAP 1—*Continued*

No.	From —	To —	Material	No.	From —	To —	Material
205	Surface 26.7 32.11 41.0	26.7 32.11 47.0 55.0	Fill. Mud. Hard yellow clay. Medium blue clay.	218	0 11.6 18.0 27.7 33.0 46.7 56.3	11.6 18.0 27.7 33.0 46.7 56.3 59.5	Fill. Medium yellow clay, fine sand. Fine yellow sand (wet). Medium blue clay, little fine sand. Fine blue sand. Medium blue clay, very little fine sand. Clay and gravel.
206	+17.5 + 5.5 — 2.8	— 5.5 — 2.8 — 8.5	Fill (cinders). Silty peat. Sand and clay.	219	Bottom of pit 3.0 20.0	3.0 20.0 26.0	Filling. Peat mud. Hard clay.
207	Cellar bottom 4.5 15.0	4.5 15.0 42.0	Fill. Clay and sand. Clay.	220	Surface 13.0 27.4 30.0	13.0 27.4 30.0 40.0	Sand filling. Mud and silt. Coarse sand. Hard clay, medium yellow sand and clay.
208	Bottom elevator pit 0.6 5.0 12.6 20.0 35.0	0.6 5.0 12.6 20.0 35.0	Concrete. Fill. Hard yellow clay. Soft clay and streaks of sand. Soft clay. Soft clay.	221	Albany Street sidewalk 8.3 10.5 10.5 23.5 26.5 27.3	8.3 10.5 23.5 26.5 27.3 35.0	Water level. Fill. Silt. Peat. Medium blue clay. Hard yellow clay.
209	Surface 4.0 21.0	4.0 21.0 81.5	Fill. Hard yellow clay. Hard blue clay.	222	Top plat- form 9.2 9.2 20.5 24.5	9.2 20.5 24.5 30.7	Space. Fill. Silt. Silt. Hard yellow clay, sand and gravel. Medium blue clay. Soft blue clay, little fine sand. Fine sand and little clay. Soft blue clay. Fine sand and little clay. Hard coarse gravel and sand.
210	Surface 19.0 22.0	19.0 22.0 42.0	Filling and mud. Fine sand and clay. Hard clay.	223	+16.58=0 0 9.2 24.5	8.2 9.2 24.5 33.0	Water level. Rubbish fill. Soft silt. Hard blue clay.
211	Surface 12.6 32.0 39.0	12.6 32.0 39.0 45.0	Filling. Silt and mud. Hard blue clay. Medium blue clay.	224a	+15.5 Harbor bottom -10.5 -25.7	Harbor bottom -10.5 -25.7 -39.0	Air and water. Soft silt. Hard blue clay. Hard blue clay and coarse gravel.
212	Surface 8.0 14.4 18.6 28.0 39.0	8.0 14.4 18.6 28.0 39.0 55.0	Loose sand fill. Loose sand and gravel fill. Mud and sand mixed. Hard packed sand and gravel. Clay and fine sand mixed (hard). Hard blue clay.	224b	+35.11 1.5 6.5 10.5 12.0 19.5	1.5 6.5 10.5 12.0 19.5 22.5	Fill. Hard yellow clay. Medium yellow clay. Fine yellow sand. Medium blue clay. Medium blue sand.
213	Basement level 3.0 8.0 18.0 27.0	3.0 8.0 18.0 27.0 56.0	Sand. Clay. Sand, gravel, rocks. Sand and clay. Sand and clay mixed hard at bottom.	225	Cellar 8.0 20.0 35.0	8.0 20.0 35.0 58.0	Soft fill. Yellow clay. Blue clay. Soft blue clay.
214	Surface 8.0 12.0 24.0	8.0 12.0 24.0 50.0	Fill. Dock mud. Hard packed gravel. Hard clay.				
215	0 11.5 16.2 17.6	11.5 16.2 17.6 30.0	Fill. Peat. Medium blue clay. Hard yellow clay.				
216	Cellar floor 3.0 22.0	3.0 22.0 28.0	Old wood. Hard clay. Clay.				
217	Surface	+30.0	Clay, sand and gravel; hardpan.				

BORINGS INDICATED ON MAP 1 — *Continued*

No.	From —	To —	Material	No.	From —	To —	Material
226	Surface 11.6	11.6 26.0	Fill. Sand and gravel.	242	Surface 11.0 13.0	11.0 13.0 35.0	Fill. Mud. Hard yellow clay.
227	Surface 9.0 13.0	9.0 13.0 30.0	Fill. Dock mud. Sand and gravel (hard).	243	Floor = +14		
228	Surface 7.0	7.0 31.0	Fill. Clay.		approx- imately + 4.5 + 2.0	+ 4.5 + 2.0 - 3.0	Space. Loose rubbish fill. Soft black silt and fine sand.
229	Surface 15.0	15.0 25.0	Clay. Clay and sand. The sand with streaks of clay.		- 3.0 -19.0	-19.0 -22.0	Soft silt and fine sand. Soft silty peat and fine sand.
230	Surface 24.0	24.0 34.0	Fill. Medium blue clay.		-22.0	-28.5	Medium blue clay and fine sand.
231	Basement floor 10.6 25.10	10.6 25.10 38.0	Loose sand, gravel and soot fill. Mud. Clay mixed with little fine sand.		-28.5 -56.0	-56.0 -60.0	Soft blue clay. Hard clay, sand and gravel (rock or boulder).
232	Cellar bottom 9.0 14.8 17.0	9.0 14.8 17.0 25.0	Fill and wood (hard). Hard fill. Sand and clay. Clay and gravel.	244	Surface 20.2 24.0 28.0 35.0	20.2 24.0 28.0 45.0	Soft silt and shells. Firm sand and gravel. Coarse sand. Sand and gravel. Hard medium sand.
233	Surface 7.0 15.0	7.0 15.0 25.0	Clay and rocks. Clay. Clay and rocks.	245	Surface 19.0 23.6	19.0 23.6 38.0	Fill. Mud. Hard clay.
234	Bottom cellar 11.10	11.10 26.0	Filling. Hard clay and rocks.	246	Surface 12.0 14.7	12.0 14.7 25.0	Gravel and sand fill. Mud. Hard packed gravel and sand.
235	Cellar floor +9 13.0 17.0	13.0 17.0 30.0	Fill. Mud. Hard blue clay.	247	Surface 34.0	34.0	Clay.
236	Cellar +10 2.0 29.0 46.0	2.0 29.0 46.0 47.8	Fill. Stiff blue clay. Sand and clay. Rocks and clay (hard).	248	Surface 20.7 33.0	20.7 33.0 42.0	Filling. Mud. Hard clay.
237	Surface 14.0 36.0 39.0 110.0	14.0 36.0 39.0 110.0 120.0	Sand and gravel. Mud and sand. Gravel. Soft clay. Clay and rocks.	249	Surface 21.0	21.0 30.0	Fill. Sand, gravel, clay and rocks; hardpan.
238	Surface 11.0 34.0	11.0 34.0 48.0	Fill. Dock mud. Hard blue clay.	250	Surface 19.0 31.5	19.0 31.5 39.0	Hard packed gravel filling. Dock mud. Loose sand and gravel.
239	Surface 10.0 15.0 30.0	10.0 15.0 30.0 38.0	Fill. Soft clay. Soft clay. Soft clay.		39.0	44.0	Hard clay and rocks mixed.
240	Surface 8.0 15.6	8.0 15.6 30.0	Filling. Mud. Hard yellow clay.	251	0 19.0	19.0 61.0	Fill. Fine sand, struck rock.
241	Surface 19.0 22.0	19.0 22.0 34.0	Fill. Silt and mud. Hard packed sand, gravel, rocks.	252	Surface 8.0	8.0 25.0	Fill. Clay and rocks.
				253	Surface	52.6	Soft sand filling, hard gravel, tough clay.
				254	Surface 14.0 26.0 31.0	14.0 26.0 31.0 80.0	Sand and gravel fill. Dock mud. Coarse sand. Blue clay.
				255	Bottom cellar 40.0	40.0 50.0	Stiff clay. Fine hard sand.

BORINGS INDICATED ON MAP 1 — *Continued*

No.	From —	To —	Material	No.	From —	To —	Material
256	0 10.0 20.0 30.0	10.0 20.0 30.0 40.0	Fill. Soft clay. Stiff clay. Stiff clay.	271	Surface 14.0 15.0 20.0	14.0 15.0 20.0 26.0	Sand and gravel fill- ing. Sand, gravel and mud. Medium sand. Sand and rocks.
257	Surface 8.5 14.3	8.5 14.3 28.0	Loose gravel and sand. Dock mud. Hard gravel and sand.	272	Surface 15.0 19.6	15.0 19.6 30.0	Gravel fill. Filling and silt. Clay, sand and rocks, struck boulder.
258	+12.0 -15.5 -23.5 -27.0 -27.0	-15.5 -23.5 -27.0 -38.0	Sand and gravel fill. Silt and mud. Medium sand. Hard clay.	273	Cellar bottom 9.0 12.0	9.0 12.0 22.0	Fill. Mud. Hard yellow clay.
259	Surface 18.0 29.0 36.0	18.0 29.0 36.0 50.0	Fill. Sand. Clay. Clay and rocks.	274	Surface 14.0 47.0 49.0	14.0 47.0 49.0 55.0	Fill. Silt and mud. Hard packed sand and gravel. Medium blue clay.
260	Starting point 12.0 23.0 36.0	12.0 23.0 36.0 65.0	Fill. Mud and sand. Hard yellow clay. Medium clay with a little very fine sand.	275	-3.50 = 0 9.0 10.5 17.5 36.5	9.0 10.5 17.5 36.5 39.8	Fine sand, very little clay. Medium blue clay. Fine sand, little clay. Fine sand. Soft blue clay and sand.
261	Surface 18.0	18.0 28.0	Filling. Clay, sand and gravel (hard).		39.8 44.5 48.5	44.5 48.5 50.0	Soft yellow clay. Medium sand, little gravel. Clay, sand and gravel.
262	Surface 18.5 44.5	18.5 44.5 63.0	Filling. Silt and mud. Medium blue clay.	276	Surface 5.0 11.5 17.2 26.0	5.0 11.5 17.2 26.0 31.10	Ashes and fill. Sand and gravel fill. Mud. Loose sand. Loose sand and gravel.
263	Surface 12.0 19.0 41.3	12.0 19.0 41.3 54.0	Fill. Black mud. Dock mud. Blue clay.	277	Cellar bottom 4.6 14.9	4.6 14.9 22.0	Ashes and sand fill. Silt and mud. Hard clay.
264	Surface 8.0 21.8	8.0 21.8 36.0	Fill. Mud. Hard clay.	278	+14.98 7.0 13.0 14.0	7.0 13.0 14.0 20.0	Fill. Peat. Medium blue clay. Hard yellow clay and fine sand.
265	Surface 4.8 10.7 31.9 41.0	4.8 10.7 31.9 41.0 56.0	Loose filling. Hard filling. Mud. Hard clay. Medium clay.		20.0 25.0	25.0 30.0	Medium yellow clay. Medium blue clay.
266*	-	-	-	279	+20.0 14.0 18.7 20.8 24.0 28.0	14.0 18.7 20.8 24.0 28.0 33.0	Sand, gravel, bricks. Peat. Soft peat and sand. Medium sand, little fine gravel. Medium blue clay. Hard yellow clay.
267	Cellar bottom 19.0 24.9	19.0 24.9 35.0	Filling. Mud. Hard yellow clay.	280	Sidewalk, Kneeland Street 12.2	12.2 21.5	Fill. Medium yellow clay and little fine sand.
268	Surface 12.6 22.0	12.6 22.0 28.0	Filling. Hard clay. Medium clay.		21.5 32.5	32.5 35.5	Soft blue clay, little fine sand. Fine blue sand, little clay.
269	Surface 23.0	23.0 33.0	Sand and gravel fill, with little mud at 23 feet. Fine sand and rocks.				
270	Surface 5.0 15.0 30.2 33.3	5.0 15.0 30.2 33.3 45.0	Filling. Sand filling. Dock mud. Medium sand. Hard blue clay.				

* Missing.

BORINGS INDICATED ON MAP 1 — *Continued*

No.	From —	To —	Material	No.	From —	To —	Material
281	8 below sidewalk 0.5 1.0 2.5	0.5 1.0 2.5 5.0	Concrete. Silt and shells. Medium blue clay and gravel. Hard yellow clay.	291	Surface 10.0 3.8	10.0 3.8 28.0	Concrete. Fill. Hard yellow clay.
282	2 below Mason Street sidewalk 11.5 16.3 19.2 19.2 39.0	11.5 16.3 19.2 39.0 47.7	Sand, gravel fill. Sharp fine sand. Mixed blue clay and fine sand. Sharp fine sand. Medium blue clay.	292	Surface 2.0 9.5 31.0	2.0 9.5 31.0 50.0	Concrete. Fill. Fine silty sand and mud. Hard blue clay.
283	+ 6.25 3.3 13.5	3.3 13.5 24.0	Pit. Fine yellow sand. Soft blue clay.	293	Surface 16.6 20.0 26.0	16.6 20.0 26.0 36.0	Fill. Fine silty sand and mud. Fine silty sand and mud. Hard packed sand and gravel.
284	+22.0 26.0 34.3 35.0 43.3 53.2 60.5	26.0 34.3 35.0 43.3 53.2 60.5 102.0	Hard sand, gravel, clay fill. Soft silt. Silty sand. Silty peat. Hard blue clay. Hard fine sand. Medium blue clay.	294	Surface 5.0 10.0 17.0	5.0 10.0 17.0 27.0	Fill. Mud. Medium sand and rocks. Coarser sand and rocks.
285	+18.7 21.5 30.2 32.0 41.5 76.5 76.5 79.2 101.5	21.5 30.2 32.0 41.5 76.5 79.2 101.5 105.0	Fill. Silt, little fine sand and shells. Sand, gravel, clay. Medium yellow clay, little fine sand. Soft blue clay and little fine sand. Medium blue sand and little clay. Medium blue clay. Hard clay, sand, gravel.	295	Cellar bottom 0.7 6.0 20.0	0.7 6.0 20.0 33.0	— — Medium yellow clay and fine sand. Fine sand and little clay. Medium blue clay.
286	-4.50 1.0 11.0 12.0	1.0 11.0 12.0 16.5	Silt. Hard yellow clay, little gravel. Medium yellow clay. Soft clay and fine sand.	296	Surface 13.0 20.0 25.0	13.0 20.0 25.0 33.0	Miscellaneous fill. Mud. Sand. Sand and rocks.
287	1.6 below Stuart Street sidewalk 2.5 19.0 34.0 49.0	2.5 19.0 34.0 58.0	Fill. Hard yellow clay and gravel. Hard yellow clay and fine sand. Medium blue clay. Fine yellow sand and little clay.	297	Surface 2.0 7.0 23.0	2.0 7.0 23.0 25.0	Fill. Gravel and clay. Hard yellow clay. Clay, sand and gravel.
288	Surface 11.6 14.6	11.6 14.6 29.0	Fill. Mud. Hard packed sand and rocks.	298	Surface 5.0 15.0 20.0 30.0	5.0 15.0 20.0 40.0	Fill. Coarse sand. Sand, gravel and rocks. Fine hard packed sand. Sand and rocks and little clay.
289	Surface 16.9 29.6	16.9 29.6 43.0	Fill. Mud. Hard blue clay.	299	Surface 9.10 24.0	9.10 24.0 39.0	Fill. Mud. Hard clay and little fine sand.
290	Surface 8.0 18.0	8.0 18.0 35.0	Fill. Hard clay. Medium clay.	300	Bottom harbor 27.0 28.0	27.0 28.0 38.0	Mud. Medium blue clay. Hard blue clay.
				301	Surface 9.0 20.0	9.0 20.0 30.0	Gravel and rock fill. Hard packed gravel and rock fill. Clay, gravel and rocks.
				302	Cellar bottom 5.4 9.3 15.6 24.0	5.4 9.3 15.6 30.0	Clay and rock fill. Hard blue clay. Soft blue clay. Medium blue clay. Clay, gravel and rocks.

BORINGS INDICATED ON MAP 1 — *Continued*

No.	From —	To —	Material	No.	From —	To —	Material
303	Surface 15.0 18.0	15.0 18.0 38.0	Miscellaneous fill. Mud and sand. Hard packed sand and gravel.	353	Surface 8.0 22.0	8.0 22.0 25.0	Fill. Loose sand and rocks. Hard packed sand and rocks.
304	Surface 29.6 43.4	29.6 43.4 56.0	Miscellaneous fill. Mud. Hard clay.	354	Surface 8.0 22.0 26.0	8.0 22.0 26.0 30.0	Fill. Hard clay. Soft clay. Clay and gravel.
305	Cellar floor 3.0 9.6 16.0 28.0	3.0 9.6 16.0 28.0 40.0	Fill. Hard clay and sand. Hard packed coarse sand. Hard clay, sand and rocks. Medium blue clay and layers of sand.	355	Cellar bottom 62.0 105.0	62.0 105.0 131.0	Clay. Clay. Fine gray sand.
306	+40.0 15.0 31.0	15.0 31.0 38.0	Fill. Mud. Hard packed sand, gravel, rock.	356	Cellar 9.0 15.0 17.0	9.0 15.0 17.0 25.0	Filling and wood. Filling hard. Sand and clay. Clay and gravel.
307	Surface 18.0 21.0 24.0	18.0 21.0 24.0 33.0	Fill. Sand and gravel fill. Sand and little mud. Hard clay.	357	Surface 24.0	24.0 34.0	Sand and gravel. Clay and sand.
308	Surface 10.10	10.10 30.0	Fill. Hard clay.	358	Surface 18.0	18.0 30.0	Hard clay. Clay and rocks.
309	Surface 20.0	20.0 28.0	Sand and gravel fill. Clay, sand and rock.	359	—	—	Black silt (dock mud) to 7 feet below cel- lar bottom, and then stiff clay.
310	Surface 18.0 32.0 40.0	18.0 32.0 40.0 50.0	Fill. Fine silty sand and mud. Hard packed sand and gravel. Medium blue clay.	360	Surface 17.0 37.0	17.0 37.0 —	Water. Mud. Hard sand.
311	Surface 23.10 30.0	23.10 30.0 42.0	Fill. Mud. Medium clay.	361	—	—	Brighton Street to center of Lowell Street depth to rock, 27 feet.
312	Surface 14.0 18.0 23.0	14.0 18.0 23.0 35.0	Fill. Fill and mud. Clay and rock fill. Medium clay.	362	+13.2 6.0 13.0 17.0 15.0	6.0 13.0 17.0 15.0 5.0	Fill. Yellow clay. Blue clay. Very fine sand. Fine sharp sand.
313	Surface 5.0 15.0 26.4	5.0 15.0 26.4 38.0	Loose ash fill. Hard packed sand and gravel. Ashes and gravel fill and mud. Medium clay.	363	Surface 16.0 20.0 27.0 31.0	16.0 20.0 27.0 31.0 38.0	Fill. Yellow clay. Clay and fine sand. Fine sand. Blue clay.
314 to 349*	—	—	—	364	Surface 16.0 24.0 31.5 35.8	16.0 24.0 31.5 39.8	Fill. Fill. Fine sand. Blue clayey sand. Fine sand.
350	Surface 15.0	15.0 30.0	Fill. Gravel and clay.	365	Surface 3.5 5.5 26.0	3.5 5.5 26.0 27.0	Fill. Coarse sand and gravel. Sand and gravel, pass- ing to fill. Fine sand.
351	Surface 4.0 9.0 14.0	4.0 9.0 14.0 40.0	Filling. Sand and clay. Sand and clay. Soft clay.	366	Surface 10.0 15.0 23.5 25.5 25.5 37.5	10.0 15.0 23.5 25.5 37.5 39.5	Fill. Yellow clay. Boulder clay. Sand and gravel. Blue clay and sand. Sand and gravel.
352	Surface 10.0 14.0	10.0 14.0 38.0	Sand and filling. Soft mud. Clay.				

* Borings Nos. 314 to 349, inclusive, information given on the Crosby Bedrock Map.

BORINGS INDICATED ON MAP 1—Continued

No.	From —	To —	Material	No.	From —	To —	Material
367	—	—	Boring ends in blue clay at —65.	385	Surface 23.0	23.0 33.0	Fill. Fine silty sand and mud. Hard yellow clay.
368	Surface +20.0 —15.0 —23.0 —32.0 —32.0 —115.0	+20.0 —15.0 —23.0 —32.0 —115.0 —117.0	Fill. Silty sand. Hard yellow sand. Hard blue clay. Soft blue clay. Fill ended on rock.	386	Surface —	Fill —	Sand and gravel. Fine silty sand and mud. Hard packed sand and gravel.
369	Surface 14.0 22.0 29.0	14.0 22.0 29.0 47.0	Fill. Mud and sand. Fine sand. Hard clay.	387	Grade +13.5 14.0 20.0	14.0 20.0 28.0	Fill. Loose sand fill. Hard packed sand and gravel.
370	Cellar floor 17.0 44.0	17.0 44.0 55.0	Fill. Mud. Fine sand, clay and rocks.	388	—	—	Series of rock readings.
371	3.0	101.0	Sand and gravel fill; mud, sand and shells; gravel and rocks (hard).	389	—	—	Series of rock readings.
372	5.0 10.0 23.0 34.0	10.0 23.0 34.0 51.0	Fill. Dock mud. Gravel and rocks. Clay.	390	Surface 4.0	4.0 32.0	Sand. Clay.
373	Surface 14.0	14.0 34.0	Fill. Fine silty sand and mud.	391	Surface 6.0 6.0 7.0 11.0	6.0 7.0 11.0 25.0	Fill. Fill, sand and gravel. Mud. Blue clay.
374	Surface 18.0	18.0 26.0	Fill. Fine silty sand and mud.	392	Surface 7.0 20.0	7.0 20.0 28.0	Fill. Mud. Blue clay.
375	Surface 10.0 23.0 38.0	10.0 23.0 38.0 50.0	Fill. Fill, wood, mud. Fine silty sand and mud. Hard blue clay.	393	Cellar 3.0 22.0	3.0 22.0 28.0	Wood. Hard clay. Clay (stiff).
376	—13.0	—28.0	Elevation of rock soundings in river, variable.	394	Cellar 5.0 15.0	5.0 15.0 42.0	Fill. Clay and sand. Clay.
377	—	—	Ledge about Elevation zero.	395	Surface 12.0 15.0 22.0	12.0 15.0 22.0 30.0	Fill. Sand and clay. Clay and rocks. Hard clay.
378	—	—	Ledge at —10.	396	Surface 6.0 68.0	6.0 68.0 74.0	Fill. Mud. Hard packed coarse sand.
379	—	—	Ledge at —15.	397	Surface 8.0 9.0 15.0	8.0 9.0 15.0 35.0	Fill, ash, clay and gravel. Fill, wood. Peat, mud. Medium blue clay.
380	—	—	Series of rock reading.	398	Surface 5.0 18.0	5.0 18.0 20.0	Fill. Sand. Clay.
381	—	—	Rock at —20.	399	Cellar 6.0 20.0 31.0	6.0 20.0 31.0 46.0	Fill. Peat, mud. Fine silty sand and mud. Hard blue clay.
382	Surface 9.0	9.0 19.0	Fill. Clay and rocks; hardpan.	400	2 below basement 12.0 12.0 19.0	12.0 19.0 31.0	Fill. Clay and rocks mixed with sand. Clay and rocks; hardpan.
383	Surface 23.0	23.0 33.0	Fill, sand and gravel. Fine sand and rocks.				
384*	—	—	—				

* Missing.

BORINGS INDICATED ON MAP 1—*Continued*

No.	From —	To —	Material	No.	From —	To —	Material
401	Surface	3.0	Cinders and gravel fill.		14.0	20.0	Silt and little peat.
	3.0	8.0	Silt, little sand and gravel.		20.0	23.0	Soft blue clay and little gravel.
	8.0	16.0	Peat and little silt.		23.0	29.0	Stiff clay and fine sand.
	16.0	32.0	Silty sand and gravel.		29.0	50.0	Medium stiff blue clay.
	32.0	35.0	Stiff blue clay.				
402	Start			408	Surface	8.0	Fill.
	+19.0	+16.0	Loam.		8.0	11.0	Soft blue clay, little gravel.
	+16.0	- 4.0	Loose sand and gravel fill.		11.0	17.0	Stiff blue clay, little sand.
	- 4.0	-20.0	Silt.		17.0	34.0	Medium stiff blue clay.
	-20.0	-22.0	Silty peat, little fine sand.		34.0	46.0	Sand, gravel, clay, very hard.
	-22.0	-24.0	Silty clay, little fine sand.				
	-24.0	-27.0	Fine dry hard sand.	409	Surface	13.0	Sand and gravel back fill.
	-27.0	-34.0	Rather soft blue clay.		13.0	43.0	Hard yellow clay, sand and gravel.
403	Start				43.0	46.0	Fine sand, little clay.
	+18.0	4.0	Loam and hard gravel.		46.0	50.0	Hard blue clay, little fine sand.
	4.0	15.0	Loose sand and gravel.				
	15.0	21.0	Soft silty sand and gravel.	410	Surface	1.5	Paving.
	21.3	23.5	Silt, little peat, fine sand.		1.5	6.0	Sand, gravel, clay.
	23.5	37.0	Silt, little fine sand.		6.0	13.0	Hard yellow clay.
	37.0	38.0	Peat, fine sand.		13.0	21.0	Hard yellow clay, gravel and sand.
	38.0	43.0	Stiff blue clay, little peat.		21.0	55.0	Stiff blue clay and sand and gravel.
	43.0	48.0	Blue clay, not so stiff.				
404	Surface	12.0	Sand and gravel fill.	411	Surface	24.0	Sand.
	12.0	18.0	Fine yellow sand.		24.0	42.0	Sand and little gravel.
	18.0	25.0	Fine silty sand.		42.0	50.0	Fairly stiff blue clay.
	25.0	30.0	Silt and little fine sand.	412	Surface	6.0	Sand, gravel and little clay.
	30.0	36.0	Stiff blue clay, little peat, and silt.		6.0	12.0	Very fine sand (yellow).
	36.0	50.0	Fine yellow sand, little clay.		12.0	14.0	Fill.
	50.0	52.0	Very fine sand, little clay.		14.0	17.0	Fine silty sand.
	52.0	58.0	Stiff blue clay, little sand, and gravel.		17.0	21.0	Loose sand gravel, little clay.
405	Surface	13.0	Sand and gravel fill.		21.0	26.0	Fairly stiff blue clay.
	13.0	15.0	Fine yellow sand.		26.0	28.0	Fine sand, little gravel and clay.
	15.0	17.0	Silty sand and gravel.		28.0	49.0	Fine blue sand and clay.
	17.0	22.0	Silty blue clay with little sand and peat.		49.0	54.0	Fairly firm blue clay, very little sand.
	22.0	23.0	Fine sand and clay.		54.0	60.0	Fairly stiff blue clay.
	23.0	30.0	Fine sand, little gravel, and clay.	413	Surface	17.0	Yellow sand, gravel, and very little clay.
	30.0	35.0	Same, softer.		17.0	22.0	Fine blue sand.
	35.0	36.0	Very fine sand, little clay.		22.0	38.0	Silt and little sand.
	36.0	37.0	Stiff blue clay, little gravel.		38.0	49.0	Stiff blue clay.
					49.0	139.0	Soft blue clay.
					139.0	143.0	Hard clay, sand and gravel.
406	Surface	17.0	Sand fill (miscellaneous).	414	Surface	12.0	Yellow sand and gravel and little clay.
	17.0	33.0	Silt, very little sand.		12.0	35.0	Silt and little clay.
	33.0	35.0	Peat.		35.0	42.0	Coarse sand, little gravel, and little clay.
	35.0	41.0	Stiff blue clay.				
	41.0	70.0	Medium stiff blue clay.				
407	Surface	8.0	Hard gravel fill.		42.0	46.0	Stiff blue clay.
	8.0	14.0	Soft silt and little gravel.		46.0	60.0	Soft blue clay.

BORINGS INDICATED ON MAP 1 — *Continued*

No.	From —	To —	Material	No.	From —	To —	Material
415	Surface	15.0	Yellow sand and gravel.	432	Surface	+58.0	Yellow clay, gravel and sand.
	15.0	18.0	Blue silty sand.		+58.0	+52.0	Sand and fine gravel.
	18.0	40.0	Silt with little sand.		+52.0	+42.0	Yellow clay and gravel.
	40.0	46.0	Peat with silt.		+42.0	+12.0	Blue clay and sand and gravel.
	46.0	60.0	Stiff blue clay.				
416	Surface	5.0	Coarse sand and little gravel.	433	Surface	+51.0	Sand and gravel and yellow clay.
	5.0	11.0	Stiff dry yellow clay and little sand.		+51.0	+46.0	Gravel with little sand and clay.
	11.0	12.0	Hard dry yellow clay and sand and gravel.		+46.0	+34.0	Sand and yellow clay.
					+34.0	+28.0	Mostly yellow clay and some sand.
	12.0	60.0	Hard blue sand and little gravel.		+28.0	+14.0	Blue clay, sand and gravel.
417	Surface	6.0	Coarse sand and gravel.	434	Surface	+41.0	Sand, clay, gravel.
	6.0	19.0	Stiff dry yellow clay, sand and gravel.		+41.0	+38.0	Coarse gravel, sand, little clay.
	19.0	46.0	Stiff dry blue clay, sand and gravel.		+38.0	+22.0	Yellow clay, gravel and sand.
	46.0	57.0	Hard blue clay, sand and gravel.		+22.0	+14.0	Stiff blue clay, little sand and gravel.
	57.0	60.0	Hard blue sand, coarse gravel.		+14.0	+11.0	Coarse sand and gravel, little clay.
418 to 427*	—	—	—		+11.0	+ 6.0	Hard blue clay, sand and gravel.
428	Start =			435†	—	—	—
	+56.0	+52.0	Loam.	436	Surface	6.0	Fill.
	+52.0	+24.0	Sand, gravel, clay.		6.0	15.0	Peat, mud.
	+24.0	+16.0	Sand, little gravel.		15.0	38.2	Mud with clam shells.
	+16.0	— 2.0	Gravel, sand, little clay.		38.2	44.0	Hard packed gravel and rocks.
	— 2.0	— 9.0	Yellow clay and sand.	437	Starting point	13.0	Fill.
	— 9.0	—15.0	Fine sand, little clay.		13.0	31.5	Mud.
429	Surface				31.5	33.0	Sand.
	+74.0	+66.0	Sand and gravel.		33.0	45.0	Hard clay.
	+66.0	—44.0	Yellow sand, clay, gravel.	438	Cellar floor	10.0	Sand fill.
	+44.0	+35.0	Sand and gravel.		10.0	20.0	Fine loose sand.
	+35.0	+ 9.0	Sand and gravel, streaks of blue clay.		20.0	35.0	Hard blue clay.
	+ 9.0	+ 4.0	Clay, gravel, little sand.	439	+14.5	5.0	Clay fill.
430	Surface				5.0	15.0	Sand and little mud fill.
	+92.0	+34.0	Yellow clay, sand and gravel.		15.0	38.5	Fine silty sand and mud.
	+34.0	+18.0	Blue clay, sand and gravel.		38.5	45.0	Medium blue clay.
	+18.0	+ 8.0	Fine sand, little clay.	440	Surface	5.0	Fill.
	+ 8.0	+ 2.0	Clay, little sand.		5.0	15.6	Sand fill and little mud.
431	Surface	+98.0	Gravel and clay fill.		15.6	38.7	Fine silty sand and mud.
	+98.0	+90.0	Fine sand.		38.7	55.0	Medium blue clay.
	+90.0	+63.0	Yellow clay, some sand and fine gravel.	441	Surface	16.8	Sand and grave fill.
	+63.0	+54.0	Gravel, with little yellow clay.		16.8	27.5	Fine silty sand and mud.
	+54.0	+36.0	Sand, gravel and blue clay.		27.5	35.0	Hard packed sand and gravel.
	+36.0	+26.0	Gravel and yellow clay.		35.0	45.0	Hard clay.
	+26.0	+13.0	Fine sand and little clay.	442	Surface	16.6	Fill.
	+13.0	+ 8.0	Mostly yellow clay, little sand.		16.6	30.5	Fine silty sand and mud.
					30.5	45.0	Medium yellow clay.

* Borings Nos. 418 to 427, inclusive, information on Crosby Boulder Clay Map.

† Bench mark reference.

BORINGS INDICATED ON MAP 1—*Continued*

No.	From —	To —	Material	No.	From —	To —	Material
443	Surface 20.0	20.0 34.8	Fill. Sand and rocks (may-be fill).	453	2 above street 2.6	2.6 7.6	Loam. Sand, gravel, brick and wood fill.
	34.8	39.6	Clay and sand with clam shells.		7.6	11.0	Mud.
	39.6	43.0	Hard packed sand and gravel.		11.0	16.6	Hard yellow clay.
444	Surface 15.0	15.0 37.0	Fill. Fine silty sand and mud.	454	Start 12.6	12.6 35.0	Soft clay and fine sand. Soft blue clay.
	37.0	44.0	Hard blue clay.		35.0	62.6	Soft blue clay.
	44.0	50.0	Soft blue clay.		62.6	71.6	Hardpan (105 blows on drill per foot).
	50.0	65.0	Soft blue clay.	455	Start	9.0	Hard fine sand and little gravel.
	65.0	80.0	Soft blue clay and stones.		9.0	22.6	Hard fine sand.
445	Surface 5.0	5.0 18.0	Fill. Sand and gravel fill.		22.6	27.0	Hardpan.
	18.0	25.5	Sand and gravel fill.	456*	—	—	—
	25.5	31.3	Fine silty sand and mud.	457	1 below curb 6.6	6.6 15.0	Fill. Hard yellow clay.
	31.3	40.0	Hard packed sand.		15.0	22.6	Hard yellow clay and sand.
446	Surface 19.0	19.0 31.4	Fill. Mud.	458	+32.71 18.0	18.0 29.6	Loose fine sand. Firm fine yellow sand and little clay.
	31.4	42.0	Medium clay.		29.6	43.0	Medium blue clay.
447	Surface 15.0	15.0 17.0	Fill. Hard packed gravel and rocks.		43.0	46.6	Hard fine blue clay, sand and gravel.
	17.0	20.0	Sand, gravel and clay (hard).	459	Start 11.0	11.0 24.6	Sand and gravel fill. Hard yellow clay and gravel.
	20.0	35.0	Hard clay and rocks.				
448	Surface 7.0	7.0 41.0	Fill and mud. Mud.	460	+17.2 13.6	13.6 17.1	Sand and gravel fill. Silt, little fine sand.
	41.0	46.3	Fine compact sand and little clay.		17.1	21.8	Peat.
449	Surface 15.0	15.0 25.6	Ashes and clay. Fine silty sand and mud.		21.8	30.4	Medium silt and shells.
	25.6	40.0	Medium blue clay.		30.4	31.8	Soft blue clay.
450	Cellar floor 3.3	3.3 11.0	Fill. Fine silty sand and mud.		31.8	40.7	Hard yellow clay.
	11.0	30.0	Medium clay.		40.7	59.0	Very soft blue clay.
451	Top of floor 17.6	17.6 39.6	Sand, mud and brick fill. Silty sand and shells.	461	Start 1.0	1.0 5.10	Fill. Hard sand and clay.
	39.6	44.10	Silty peat.		5.10	15.3	Medium yellow clay and sand.
	44.10	47.4	Fine silty sand.		15.3	21.0	Sharp fine sand.
	47.4	50.6	Hard coarse sand and gravel.		21.0	31.6	Sharp medium sand.
	50.6	62.4	Medium blue clay.		31.6	39.6	Medium blue clay.
	62.4	66.6	Clay, sand and gravel (hard).	462	Nashua Street level 7.6	7.6 21.4	Fill. Silty sand fill.
452	Start 9.6	9.6 17.0	Sand and gravel fill. Hard yellow clay, little fine sand.		7.6	21.4	Silt.
	17.0	22.0	Medium blue clay and fine sand.		21.4	26.0	Coarse silty sand and gravel.
	22.0	28.0	Hard clay, sand and little gravel.		26.0	27.6	Hard blue clay.
	28.0	36.6	Hard clay, sand and little gravel.	463	Surface 13.0	13.0 20.0	Filling. Peat, mud.
					20.0	21.0	Sand.
					21.0	35.0	Medium blue clay.
				464	5.5 below curb 5.0	5.0 16.6	Fill. Hard yellow clay.
					16.6	22.6	Hard yellow clay, sand and gravel.

* Missing.

BORINGS INDICATED ON MAP 1 — *Continued*

No.	From —	To —	Material	No.	From —	To —	Material
465	5 below curb 6.0 15.0	6.0 15.0 35.0	Fill. Hard yellow clay. Hard blue clay and fine gravel.	473	2.4 below Co. st = 00 12.0 13.6 17.0	12.0 13.6 17.0	Loose coarse sand and gravel fill and rip- rap. Hard yellow clay and gravel. Hard fine sand, gravel, clay (hardpan).
466	Grade +18.0 19.0 34.0	19.0 34.0 45.0	Ashes and rubbish fill. Medium silt, little fine sand and peat. Hard blue clay, part yellow.	474	Surface 30 below wharf 4.0 14.0 64.0	4.0 14.0 64.0 72.6	Soft silt. Hard yellow clay. Medium blue clay. Compact sand, gravel, clay.
467	Surface 10.5 13.4	10.5 13.4 20.0	Loose sand and brick fill. Soft blue clay. Hard yellow clay.	475	Sidewalk + 0.6 16.0 21.6 41.0 44.7	16.0 21.6 41.0 44.7 55.0	Cinder, clay fill. Silt. Packed coarse sand. Medium blue clay. Soft blue clay.
468	-16.38 7.4 13.6 17.4 38.6	7.4 13.6 17.4 38.6 44.6	Black mud. Silty sand and shells. Coarse hard sand, gravel. Medium blue clay, little fine sand. Hard compact sand, little clay.	476	Start 8.0 13.0	8.0 13.0 23.0	Clay fill, little gravel. Medium yellow clay and little sand. Hard yellow clay and little gravel, sand.
469a	Sidewalk Start 1.8 8.10 15.5 17.6 26.9 30.9 38.6 48.0 50.0	Start 6.6 1.8 8.10 15.5 17.6 26.9 30.9 38.6 48.0 53.0	— — Clay, sand and brick fill. Hard yellow clay and little fine sand. Fine blue sand. Hard blue clay, little fine sand. Hard blue sand. Hard blue clay, sand and little fine gravel. Hard sand, gravel and clay. Hard yellow clay and gravel. Slate. 200 blows to 6 inches.	477	Surface 6.0 14.5	6.0 14.5 30.0	Fill. Mud and little fill. Hard yellow clay.
				478	Sidewalk Start 10.0 12.3 12.3 14.0	Start 5.6 10.0 12.3 14.0 18.6	Space. Fill. Soft black mud. Compact fine sand. Hard yellow clay.
				479	Start 9.2 11.8 15.6 19.6	9.2 11.8 15.6 19.6 23.0	Clay and rubbish fill. Silt, little fine sand and shells. Wood and stone. Hard blue clay. Hard yellow clay, little fine sand.
469b	Start 18.0 22.4 30.0	18.0 22.4 30.0 36.0	Loose sand, gravel and cinder fill. Soft silt and fine sand. Loose coarse sand and shells. Hard fine sand, gravel and clay.	480	Surface 8.6 30.6	8.6 30.6 38.0	Fill. Medium silt and very little fine sand. Stiff blue clay.
470	Bottom of pit 8.6	8.6 35.0	Fine gray sand. Soft blue clay.	481	Start 15 below sidewalk 3.0 22.0	3.0 22.0 30.0	Fill. Medium silt and peat. Hard blue clay.
471	Surface 13.0 23.9 26.0	13.0 23.9 28.6	Fill. Fine silty sand and mud. Coarse loose sand. Hard blue clay.	482	3.5 below Mount Vernon Street sidewalk 20.5 23.7 41.5 47.0	20.5 23.7 41.5 44.7 48.5	Cinder fill. Silt, little fine sand. Silty sand and shells. Hard coarse sand and coarse gravel. Hard blue clay.
472	To channel bottom 20.0 28.2 28.2 42.10 63.8	20.0 28.2 42.10 63.8 67.8	Water and air. Soft mud. Soft blue clay. Hard sand, gravel and clay. Very fine cemented sand.	483	13.4 below sidewalk 9.6 13.0	9.6 13.0 14.6	Sand and gravel fill. Silty peat. Coarse sand and gravel.

BORINGS INDICATED ON MAP 1 — *Continued*

No.	From —	To —	Material	No.	From —	To —	Material
	14.6	21.0	Peat.	494	Bottom of pit	15.6	Soft clay and fine sand.
	21.0	22.6	Silty sand.		15.6	19.6	Hard packed sand and gravel.
	22.6	44.0	Silt and shells.		19.6	26.0	Fine compact sand.
	44.0	47.0	Coarse sand and gravel.				
	47.0	49.6	Medium blue clay.				
	49.6	59.0	Medium yellow clay.				
484	El. 5.25	17.3	Loose sand and clay fill.	495	Start +8.0	9.0	Cinders, sand and gravel fill.
	17.3	23.0	Soft silt.		9.0	20.9	Soft silty fine sand and shells.
	23.0	30.0	Firm coarse sand and gravel.		20.9	26.6	Silty sand.
	30.0	33.1	Hard blue clay.		26.6	31.0	Medium sharp dark sand, little gravel.
	33.1	80.0	Soft blue clay.		31.0	42.3	Medium blue clay, and fine sand.
485	5 below sidewalk	8.0	Sand and gravel fill.		42.3	51.6	Fine sharp gray sand.
	8.0	38.6	Fine silty sand, little shells.		51.6	54.6	Soft blue sand, clay, little gravel.
	38.6	40.6	Sand, little fine gravel.				
	40.6	48.0	Medium blue clay.	496	El. 22.0	22.6	Cinders, sand and gravel fill.
486	Surface	8.0	Fill.		22.6	40.9	Silt and fine sand.
	8.0	15.0	Mud.		40.9	47.6	Medium blue clay, little fine sand.
	15.0	46.0	Fine silty sand and mud.		47.6	53.3	Soft blue clay, little fine sand.
	46.0	55.0	Hard packed sand and gravel.		53.3	61.6	Medium blue clay, sand and gravel.
487	El. +10.5	16.10	From coarse sand and gravel fill.		61.6	80.0	Soft blue clay, little fine sand.
	16.10	17.8	Soft silty sand.				
	17.8	22.0	Sharp fine sand.	497	+19.5	22.0	Loose sand and gravel fill.
	22.0	30.4	Soft clay and fine sand.		22.0	44.0	Silt with little fine sand.
	30.4	43.0	Soft blue clay.		44.0	48.0	Sand, gravel and clay.
	43.0	44.8	Hard coarse sand and gravel.		48.0	72.0	Medium blue clay.
488	Surface	15.0	Sand and gravel fill.	498	4 below curb	14.0	Cinders, sand and gravel fill.
	15.0	25.0	Fine sand and silt.		14.0	30.9	Silt, fine sand and shells.
	25.0	35.0	Medium blue clay.		30.9	36.6	Soft blue clay, little fine sand.
489	Surface	15.0	Fill.		36.6	50.0	Soft blue clay and fine sand.
	15.0	30.0	Fine silty sand and mud.				
	30.0	33.6	Medium sand.				
	33.6	43.0	Hard blue clay.				
490	El. 14.0	15.6	Sand fill.	499	+10.5	15.0	Fill.
	15.6	32.6	Silty sand.		15.0	37.0	Fine silty sand and mud.
	32.6	37.0	Medium sand, little clay.		37.0	44.0	Hard blue clay.
	37.0	42.6	Medium yellow clay.		44.0	50.0	Medium blue clay.
	42.6	51.1	Soft blue clay.		50.0	65.0	Soft blue clay.
491	Surface	13.3	Fill.		65.0	80.0	Soft blue clay and stones.
	13.3	32.2	Fine silty sand and mud.				
	32.2	45.0	Hard blue clay.	500	Starting point	12.0	Gravel and rock fill.
492	El. 19.5	22.0	Sand fill.		12.0	20.0	Gravel and rock fill.
	22.0	40.0	Silty sand.		20.0	22.0	Sand with shells and traces of mud.
	40.0	44.0	Silty.		22.0	37.0	Hard yellow clay.
	44.0	50.0	Medium blue clay.				
	50.0	66.0	Soft blue clay.	501	8 below sidewalk level	Start	Peat.
493	Surface	13.0	Fill.		Start	2.6	Sand, gravel and clay.
	13.0	21.0	Fine sand fill.		2.6	3.6	Hard yellow clay.
	21.0	22.0	Mud.		3.6	25.6	
	22.0	35.0	Compact medium sand and rocks.				

BORINGS INDICATED ON MAP 1 — *Concluded*

No.	From —	To —	Material	No.	From —	To —	Material
502	Start	12.0	Sand and gravel fill.		135.6	136.0	Boulder.
	12.0	19.2	Medium peat.		136.0	139.0	Hard coarse sand, little fine gravel.
	19.2	30.0	Medium coarse sand and gravel.		139.0	140.0	Hardpan.
503	El. 14.6	9.6	Loose sand and gravel fill.	508	Surface	5.0	Fill.
	9.6	15.5	Hard coarse sand and gravel.		5.0	17.6	Sand and gravel fill.
	15.5	17.0	Hard coarse sand and little gravel.		17.6	33.5	Fine silty sand and mud.
	17.0	20.5	Hard coarse sand and gravel.	509	33.5	38.6	Hard blue clay.
504	Surface	11.4	Fill.		38.6	51.0	Medium yellow clay.
	11.4	24.6	Fine silty sand and mud.		+13.0	21.3	Loose sand and gravel fill.
	24.6	28.10	Hard packed mud, sand, little gravel.	510	21.3	27.6	Silty sand and shells.
	28.10	35.0	Hard blue clay.		27.6	29.6	Silty peat.
505	+14.0	6.6	Fill.		29.6	35.7	Loose coarse sand and coarse gravel.
	6.6	13.0	Silty sand.	511	35.7	45.0	Firm fine blue sand.
	13.0	14.0	Dirty sand.		Surface	12.6	Fill.
	14.0	17.0	Fine sharp sand.		12.6	19.6	Mud.
	17.0	25.0	Hard sharp sand and gravel.	512	19.6	30.0	Hard yellow clay.
506	+18.0=0	23.3	Loose coarse sand and gravel fill.		7.9 below sidewalk =start	9.0	Fill.
	23.3	32.0	Medium silt, fine sand and shells.		9.0	12.0	Very soft silt and sand.
	32.0	41.6	Medium silt.	513	12.0	13.6	Fine sand, very little clay.
	41.6	43.0	Fine compact sand and little clay.		13.6	15.6	Medium blue sand, little clay.
	43.0	46.0	Fine sharp gray sand, stratum of clay.		15.6	16.6	Medium yellow clay, sand and gravel.
	46.0	51.0	Medium blue clay and fine sand.		16.6	18.6	Hard yellow clay, little sand, little gravel.
	51.0	77.6	Medium blue clay, very little sand.		12.1 below sidewalk =0	25.2	Hard yellow sand.
	77.6	84.0	Medium blue clay and stratum of sand.		25.2	27.6	Medium blue clay.
	84.0	87.0	Fine blue sand, little clay and gravel.		27.6	32.8	Hard yellow sand.
	87.0	107.3	Medium blue clay.		32.8	38.6	Hard yellow sand and little gravel.
	107.3	118.0	Stiff blue clay, little gravel.		38.6	42.3	Hard fine yellow sand.
					42.3	46.2	Medium blue clay.
					46.2	52.1	Hard blue sand.
507	Sidewalk	29.9	Fill.		52.1	63.6	Medium blue clay.
	29.9	41.3	Silt, little fine sand.		63.6	74.6	Hard sand, gravel and clay (hardpan).
	41.3	46.9	Medium yellow clay, little fine sand.	514	—	—	Rock or boulder.
	46.9	51.0	Fine blue sand and clay.		El. +16.0	17.6	Hard coarse sand, fill.
	51.0	52.0	Fine blue sand.		17.6	32.0	Loose coarse sand, fill.
	52.0	57.6	Medium blue clay, little fine sand and gravel.	515	32.0	37.5	Hard yellow clay.
	57.6	85.0	Medium blue clay.		7.0 below surface	31.10	Sand and gravel fill.
	85.0	86.9	Hard sand and gravel, little clay.		31.10	33.6	Soft silt and fine sand.
	86.9	103.0	Loose coarse sand and coarse gravel.	515	33.6	37.0	Medium sharp blue sand.
	103.0	108.0	Loose coarse sand and coarse gravel.		37.0	47.7	Hard yellow clay with layers of fine sand.
	108.0	123.6	Hard coarse sand, gravel, little clay.		6.0 below sidewalk =0	10.3	Soft mud.
	123.6	126.0	Hard fine sand, little clay.		10.3	24.0	Soft silt.
	126.0	131.6	Clay, sand and little gravel.		24.0	31.0	Hard yellow clay.
	131.6	134.0	Medium blue clay.		31.0	39.9	Medium yellow clay.
	134.0	135.6	Medium fine sand, little clay.		39.9	80.0	Soft blue clay.
					80.0	81.8	Fine sand, little gravel.
					81.8	88.8	Hard coarse sand and coarse gravel; little clay.

BORINGS INDICATED ON MAP 2

NOTE.—Figures preceded by plus or minus signs are elevations referred to Boston datum; otherwise figures are distances in feet from starting point of boring.

No.	From —	To —	Material	No.	From —	To —	Material
1	Surface 7.0 13.0 19.0	7.0 13.0 19.0 35.0	Filling. Mud. Fine sand. Sand and rocks.	11	29.5 19.5 .5	19.5 .5 - 7.9	Sand and gravel fill. Silt. Medium blue clay.
2	Surface 10.0 20.0 32.0	10.0 20.0 32.0 36.0	Filling. Mud. Medium sand (hard packed). Hard blue clay.	12	Surface 19.8 37.2 39.2	19.8 37.2 39.2 75.0	Filling. Fine silty sand and mud. Medium sand. Soft blue clay.
3	Surface 10.0 20.0 32.0	10.0 20.0 32.0 36.0	Filling. Mud. Medium sand (hard packed). Hard blue clay.	13	Start 22.0 27.0	22.0 27.0 32.0	Soft silt. Soft blue clay. Hard yellow clay.
4	0 4.5 21.5 22.5 25.5 27.0 30.0	4.5 21.5 22.5 25.5 27.0 30.0 55.0	Sand and gravel fill. Peat. Loose silty sand and gravel. Rather firm sand, gravel, little clay. Rather stiff blue clay, little fine sand. Stiff yellow clay, very little fine sand. Rather soft blue clay.	14	Surface 7.0 10.0 14.9 22.0	7.0 10.0 14.9 22.0 30.0	Fill. Fill and mud. Fine loose sand. Fine sand and some clay. Yellow clay with streaks of sand and gravel.
5	0 16.0 28.0 37.0 37.0	16.0 28.0 37.0 45.0	Peat and mud. Peat and mud. Sand and gravel. Hard blue clay and little fine sand.	15	+49.0 39.3	39.3 -	Sand, gravel and clay. Rock.
6	Surface 4.0 24.0 25.6	4.0 24.0 25.6 41.0	Filling. Fine silty sand and mud. Compact sand and gravel. Hard blue clay.	16	Surface 9.0 29.0 35.0	9.0 29.0 35.0 40.0	Filling. Silt and mud. Sand, clay and rocks. Medium blue clay.
7	Surface 7.0 33.0 36.8	7.0 33.0 36.8 50.0	Hard filling. Silt and mud. Loose sand, and gravel. Medium blue clay and fine sand.	17	+61.5 +56.3	+56.3 -	Sand, gravel and clay. Rock.
8	Surface 3.0 31.0 35.6	3.0 31.0 35.6 45.0	Fill. Fine silt, sand and mud. Coarse sand. Clay and fine sand.	18	+69.5 +62.5	+62.5 -	Sand, gravel and clay. Rock.
9	Surface 31.0 29.0 30.4	3.0 29.0 30.4 50.0	Sand and gravel fill. Peat, mud. Loose sand and gravel. Soft clay.	19	Surface 6.0 68.0	6.0 68.0 74.0	Fill. Mud. Hard packed coarse sand.
10	Surface 3.0 29.0 30.4	3.0 29.0 30.4 50.0	Sand and gravel fill. Peat, mud. Loose sand and gravel. Soft clay.	20	Cellar bottom 8.0 16.6	8.0 16.6 36.10	Sand and gravel fill. Peat, mud. Clay.
				21	Surface 3.0	3.0 15.0	Fill. Hard clay.
				22	Surface 13.0 19.0 27.0 47.0	13.0 19.0 27.0 47.0 60.0	Fill. Peat, mud. Fine loose sand. Medium hard packed sand. Medium blue clay.
				23	Cellar bottom 7.0	7.0 20.0	Fill. Hard clay.
				24	Surface 7.0 13.0	7.0 13.0 24.0	Fill. Soft mud. Clay and rocks.
				25	Surface 13.0 25.0 25.0 45.0	13.0 25.0 45.0 56.0	Fill. Soft mud. Sand and little clay. Stiff blue clay.

BORINGS INDICATED ON MAP 2 — *Continued*

No.	From —	To —	Material	No.	From —	To —	Material
26	Surface 12.0 70.0	12.0 70.0 80.0	Fill. Mud. Blue clay and fine sand.	40	Surface 4.8 32.6 34.6	4.8 32.6 34.6 53.0	Filling. Mud and silt. Sand and gravel. Medium blue clay.
27	Surface 11.0 13.0 22.0 27.0	11.0 13.0 22.0 27.0 29.0	Hard clay. Clay and gravel. Hard clay. Gravel. Sand.	41	—	—	Clay, coarse sand and gravel.
28	Surface 11.0 15.0 25.0	11.0 15.0 25.0 48.0	Soft mud and clay. Soft clay and sand mixed. Clay and little sand. Stiff blue clay.	42	Surface 3.6 7.0 21.6	3.6 7.0 21.6 31.0	Fill. Gravel, probably fill. Mud. Blue clay.
29	Surface 12.0 30.0 32.0 32.0	12.0 30.0 32.0 50.0	Fill. Mud. Sand and gravel. Stiff blue clay.	43	Surface 17.0	17.0 29.0	Loose filling. Hard packed sand, gravel and rocks.
30	Surface 2.0 33.0 40.0	2.0 33.0 40.0 50.0	Sand and gravel fill. Mud. Sand and gravel. Medium hard blue clay and rocks.	44	Surface 19.4 25.0	19.4 25.0 58.3	Soft clay. Coarse sand. Coarse sand and gravel.
31	Surface 4.0 22.0	4.0 22.0 35.0	Fill. Medium hard clay and sand. Soft blue clay.	45	Surface 6.0 9.0 15.0 25.0	6.0 9.0 15.0 25.0 35.0	Fill. Peat, mud. Fine compact sand. Hard clay. Medium clay.
32	Surface 5.0 33.0	5.0 33.0 44.0	Fill. Mud. Medium blue clay.	46	Start 3.0 25.0	3.0 25.0 30.0	Fine sand. Sand and little clay. Fine sand and clay.
33	Surface 6.0 8.6	6.0 8.6 22.0	Filling. Peat, mud. Coarse sand and gravel mixed.	47	Surface 5.0 28.0 35.0	5.0 28.0 35.0 43.0	Loam and sand. Compact medium sand. Fine sand and little clay. Sand, gravel, rock.
34	Surface 9.0 17.7	9.0 17.7 24.0	Fill. Mud. Hard packed sand and gravel.	48	Surface 12.0 22.0	9.0 12.0 22.0 35.0	Fill and mud. Hard packed sand and gravel. Fine compact sand. Medium blue clay.
35	Surface 19.5 31.0 34.0	19.5 31.0 34.0 45.0	Fill. Mud and silt. Hard packed sand and gravel. Hard blue clay.	49	Surface 5.0 14.9 19.6	5.0 14.9 19.6 30.0	Fill. Mud. Sand. Medium clay.
36	Surface 5.6 9.8	5.6 9.8 20.0	Gravel and rock fill. Soft mud and sand. Hard packed gravel and rocks.	50	Surface 9.0 20.7	9.0 20.7 35.0	Fill. Peat, mud. Hard blue clay.
37	Surface 5.6 12.9	5.6 12.9 20.0	Fill. Mud. Hard sand and gravel.	51	Surface 2.0 19.0	2.0 19.0 25.0	Fill. Fine sand and little clay. Hard packed sand and rocks.
38	Surface 10.0 11.0 16.0	10.0 11.0 16.0 28.0	Fill. Mud. Soft clay. Hard packed sand.	52	Surface 14.0 20.0 30.0	14.0 20.0 30.0 52.0	Fill. Mud. Fine compact sand. Fine compact sand, little clay.
39	Surface 4.0 10.0	4.0 10.0 25.0	Filling mud and gravel. Soft mud. Stiff clay.	53	1 above Hemenway Street sidewalk 13.0 17.0 18.5	13.0 17.0 18.5 27.0	Fill. Peat. Dirty medium sand. Fine blue sand.

BORINGS INDICATED ON MAP 2 — *Continued*

No.	From —	To —	Material	No.	From —	To —	Material
54	Surface 7.8 12.0 17.9	7.8 12.0 17.9 33.0	Fill. Mud. Fine sand. Medium blue clay.	66	+17.25 9.10 12.8 19.6	9.10 12.8 19.6 25.0	Sand and gravel rub- bish fill. Peat. Peaty sand. Hard coarse sand, fine gravel.
55	Surface 14.6 18.0	14.6 18.0 30.0	Sand fill. Mud. Hard packed sand and gravel.	67	Surface 1.6 7.9 24.5 28.7	1.6 7.9 24.5 28.7 40.0	Ashes, fill. Ashes and gravel fill. Mud and silt. Coarse sand with lay- ers of clay. Medium blue clay.
56	Bottom of pit 9.0 15.0 23.0	9.0 15.0 23.0 26.0	Filling. Fine loose sand. Fine compact sand and little clay. Clay, sand and rocks.	68	+ 9.5 1.0 18.0 20.0 21.6	1.0 18.0 20.0 21.6 25.0	Fill. Peat. Dirty sand and gravel. Medium blue clay. Hard yellow clay.
57	Surface 3.5 12.5 22.5 27.5 29.5	3.5 12.5 22.5 27.5 50.0	Fill. Soft silty peat. Silty sand. Soft silt, little fine sand, little clay. Fine blue sand, little clay. Medium yellow clay.	69	Surface 4.0 12.6 20.0 20.0	4.0 12.6 20.0 35.0	Fill. Mud. Coarse sand. Medium blue clay.
58*	—	—	—	70	Surface 6.0 31.4 34.4	6.0 31.4 34.4 48.0	Fill. Peat, mud. Loose sand and gravel and broken shells. Medium blue clay.
59	Surface 13.6 29.0 32.0	13.6 29.0 32.0 42.0	Fill. Fine silty sand and mud. Hard packed sand and gravel. Medium blue clay.	71	4.3 below curb 6.6 26.0 29.6 34.0	6.6 28.0 29.6 34.0 39.6	Cinder fill. Silt, fine sand and shells. Loose dirty sand and gravel. Soft blue clay and fine sand. Medium blue clay and fine sand.
60	Surface 17.6 22.7	17.6 22.7 30.0	Fill. Fine silty sand and mud. Hard packed sand and gravel.	72	Surface 14.0 26.4 30.9	14.0 26.4 30.9 40.0	Ashes and gravel fill- ing. Mud and silt. Loose sand. Hard yellow clay.
61	Surface 13.0 24.7	13.0 24.7 35.0	Fill. Fine silty sand and mud. Hard yellow clay.	73	+11.2 6.6 14.6 20.2	6.6 14.6 20.2 28.0	Loose sand and gravel fill. Silty peat. Firm coarse dirty sand and gravel. Medium blue clay and fine sand.
62	Surface 24.0 32.0 35.0	24.0 32.0 35.0 45.0	Excavated. Mud, silt and sand. Coarse loose sand. Medium blue clay.	74	Surface 7.0 32.0 35.6	7.0 32.0 35.6 47.0	Fill. Fine silty sand and mud (little sand 17 to 20) Hard packed sand and gravel. Soft blue clay and little sand.
63	Surface 8.0 24.0 30.0 34.0	8.0 24.0 30.0 34.0 85.3	Fill. Loose sand fill. Fine silty sand and mud. Loose sand and gravel. Soft blue clay, struck rock.	75	+12.0 12.0 30.2	12.0 30.2 31.6	Sand, gravel and cin- der fill. Silty sand and shells. Loose dirty sand and gravel.
64	Surface 17.10 23.0	17.10 23.0 29.0	Loose sand and gravel fill. Silt, little fine sand and shells. Hard coarse sand and gravel.				
65	Sidewalk — 1.0 10.0 16.10 18.0	10.0 16.10 18.0 25.0	Loose sand and gravel fill. Peat and silt. Dirty sand. Coarse sand and gravel.				

* Omitted.

BORINGS INDICATED ON MAP 2 — *Concluded*

No.	From —	To —	Material	No.	From —	To —	Material
	31.6	34.6	Medium coarse sand and gravel.	81b	Surface	7.0	Fill.
	34.6	43.6	Stiff blue clay (19 blows on drill per foot).		7.0	10.6	Peat and gravel.
					10.6	12.0	Sharp yellow sand.
					12.0	17.0	Hard blue clay, little fine sand.
76	Surface	11.3	Filling.	82	Surface of street	11.2	Cinder and brick fill.
	11.3	13.6	Mud.		11.2	19.10	Peat.
	13.6	18.0	Loose sand.		19.10	23.9	Firm coarse sand and gravel.
	18.0	27.3	Hard packed sand.		23.9	26.3	Hard blue sand and gravel.
	27.3	35.0	Medium blue clay.		26.3	30.0	Medium yellow clay and fine sand.
77	El. +12.0	4.10	Cinder fill.				
	4.10	11.0	Soft peat.				
	11.0	15.4	Hard coarse sand and gravel.	83	Surface	20.6	Fill.
	15.4	21.6	Hard yellow clay.		20.6	30.3	Silt.
	21.6	27.6	Medium blue clay.		30.3	32.8	Firm dirty sand and gravel.
	27.6	124.0	Soft blue clay, little fine sand.		32.8	40.0	Hard blue sand and gravel.
	124.0	132.0	Hard sharp blue sand.				
78	+18.5	11.6	Rubbish fill.	84	0	7.0	Fill.
	11.6	28.3	Silt and peat.		7.0	20.0	Silty peat.
	28.3	35.0	Coarse sand and gravel.		20.0	24.0	Silt and fine sand.
	35.0	40.0	Hard blue clay.		24.0	25.3	Dirty sand and gravel.
					25.3	28.0	Hard coarse dark gravel and sand.
79	3.6 below street	6.0	Ashes, clay and gravel fill.		28.0	34.0	Hard blue clay, little fine sand.
	6.0	14.0	Hard clay, sand and gravel.	85	0.6 below top rail	4.0	Fill.
	14.0	36.6	Medium blue clay.		4.0	5.6	Soft dirty sand.
	36.6	44.6	Hard clay, sand and gravel.		5.6	11.6	Hard coarse yellow gravel and sand.
					11.6	14.0	Medium sharp yellow sand.
80	Surface	7.0	Fill.		14.0	15.6	Medium yellow clay and fine sand.
	7.0	14.6	Peat, mud.		15.6	—	Medium blue clay, little sand.
	14.6	20.0	Hard packed sand and gravel.				
	20.0	30.0	Medium blue clay.	86	+ 1.6	13.0	Fill.
81a	From 4.6 below curb	8.0	Cinder fill.		13.0	17.0	Peat.
	8.0	14.3	Peat.		17.0	19.0	Sharp gray sand, little gravel.
	14.3	25.0	Fine sharp sand.		19.0	21.6	Fine sharp gray sand.
	25.0	32.6	Medium sharp sand, little gravel.		21.6	25.0	Fine sharp yellow sand.
					25.0	27.0	Medium blue clay, little blue sand.

BORINGS INDICATED ON MAP 3

NOTE.—Figures preceded by plus or minus signs are elevations referred to Boston datum; otherwise figures are distances in feet from starting point of boring.

No.	From —	To —	Material	No.	From —	To —	Material
1	+22.5	+18.8	Hard sand and gravel fill.	14	Surface	17.6	Sand and clay fill.
	+18.8	+11.5	Soft clay and gravel fill.		17.0	26.0	Loose sand and gravel.
	+11.5	+ 2.5	Hard sand and gravel.		26.0	35.0	Hard packed sand and gravel.
2	+20.5	+11.3	Sand, gravel and clay fill.	15 to 23*	—	—	—
	+11.3	+ 8.5	Peat and clay fill.	24	Surface	11.0	Yellow clay and sand.
	+ 8.5	+ .2	Medium clay, sand and gravel.		11.0	22.0	Blue clay and sand.
	+ .2	— 9.5	Loose coarse gravel.		22.0	35.0	Medium blue clay.
					35.0	42.6	Medium blue clay and sand.
3	+22.3	+19.3	Hard sand and gravel.	25	Surface	10.0	Filling.
	+19.3	+ 9.8	Hard sand, gravel and clay.		10.0	14.0	Fine sand and clay.
	+ 9.8	+ 2.3	Hard sand and gravel.		14.0	25.0	Hard packed medium sand.
4	+22.0	+18.0	Hard sand and gravel.	26	Surface	3.0	Hard packed gravel.
	+18.0	+16.3	Loamy sand.		3.0	10.0	Compact sand with little clay.
	+16.3	+ 2.0	Hard fine sand and clay.		10.0	25.0	Hard packed sand and gravel.
5	+16.5	— 5.5	Fill.	27	Surface	15.0	Soft clay and sand fill mixed with mud.
	— 5.5	— 6.7	Silty sand.		15.0	30.0	Sand and mud.
	— 6.7	—13.5	Hard yellow clay.		30.0	40.0	Soft blue clay.
6	+16.5	— 4.7	Fill.	28	Surface	5.0	Sand, gravel, little clay.
	— 4.7	— 5.8	Silty sand, shells and gravel.		5.0	18.6	Hard packed sand and gravel.
	— 5.8	—13.5	Hard yellow sand.		18.6	25.0	Hard packed fine dark sand.
7	+16.5	— 6.9	Fill.		25.0	40.0	Medium clay.
	— 6.9	—13.5	Hard yellow clay.	29	Surface	21.0	Sand and gravel fill.
8	+18.5	— 3.5	Fill.		21.0	30.0	Mud and silt.
	— 3.5	— 5.5	Silty sand.		30.0	45.0	Hard clay.
	— 5.5	— 7.8	Peat.	30	Surface	19.0	Fill.
	— 7.8	—13.5	Hard yellow clay.		19.0	29.0	Mud.
9	+21.5	— 3.7	Fill.		29.0	42.0	Medium hard clay (6 borings average).
	— 3.7	— 5.9	Silty sand.		Surface	17.0	Fill.
	— 5.9	—13.5	Hard yellow clay.		17.0	36.0	Mud.
10	Surface	15.0	Silt and fine sand.		36.0	44.0	Hard clay.
	15.0	20.0	Hard yellow clay.		Surface	17.0	Fill.
	20.0	30.0	Medium clay.		17.0	36.0	Mud.
11	Surface	15.0	Fill.		36.0	44.0	Hard clay.
	15.0	25.0	Blue clay and fine sand.	31	Surface	15.0	Fill.
	25.0	31.0	Brown sand and little clay.		15.0	37.0	Mud.
12	Surface	—	Miscellaneous fill.		37.0	47.0	Hard blue clay (5 borings average).
	+16.0	— .5	Silt.		Surface	14.0	Fill.
	— .5	— 1.2	Medium blue clay.		14.0	38.0	Mud.
	— 1.2	— 2.6	Hard yellow sand.		38.0	54.0	Hard blue clay.
	— 2.6	— 5.0	Stiff yellow clay.	32	Surface	14.6	Fill.
	— 5.0	— 6.4			14.6	16.8	Dock mud.
13	Surface	10.0	Fill.		16.8	20.0	Clay.
	10.0	16.0	Hard packed sand and gravel.		20.0	34.6	Dock mud and fine sand.
	16.0	28.0	Fine loose sand.		34.6	36.8	Hard blue clay.
	28.0	33.0	Sand, clay, rock.	33	Surface	4.0	Sand and gravel.
	33.0	36.0	Hard yellow clay.		4.0	12.0	Gravel and rocks.
					12.0	24.0	Hard sand and gravel.

* Borings 15-23, inclusive, notes only.

BORINGS INDICATED ON MAP 3 — *Continued*

No.	From —	To —	Material	No.	From —	To —	Material
34	Surface 5.0 22.0 26.0	5.0 22.0 26.0 40.0	Fill. Soft mud. Sand. Hard clay.	48	Surface 24.0	24.0 36.0	Fill. Clay.
35a	Top hole 10.0 20.0	10.0 20.0 28.6	Fill. Coarse sand. Coarse sand and gravel.	49	Surface 11.0 17.0 24.0 29.0	11.0 17.0 24.0 29.0 42.0	Fill. Mud. Sand. Fine gray sand. Medium clay and fine sand mixed.
	28.6 39.0	39.0 41.0	Dock mud. Stiff blue clay.	50	Surface 6.0 17.0	6.0 17.0 43.0	Fill. Clay and sand mixed. Hard clay.
35b	Surface 17.0 34.0 54.6	17.0 34.0 54.6 56.0	Sand and gravel fill. Sand and gravel fill, fairly hard packed. Clay and sand. Clay and rocks, hardpan.	51	Surface 15.0 35.0	15.0 35.0 44.0	Fill. Mud. Clay.
36	Surface 11.0	11.0 50.0	Fill. Soft blue clay.	52	Surface 8.0 13.0 18.0	8.0 13.0 18.0 27.0	Fill. Peat, mud. Sand. Blue clay.
37	Surface 15.0	15.0 45.0	Coarse sand and gravel fill. Blue clay.	53a	0 13.0 14.0 15.0	13.0 14.0 15.0 44.0	Water. Black silt. Silty sand and gravel. Soft black clay, boulder or ledge.
38	Surface 12.0 17.6	12.0 17.6 22.0	Clay fill. Fine sand and mud mixed. Hard clay.	53b	0 14.0 15.0 16.0 22.0 64.0	14.0 15.0 16.0 22.0 64.0 73.0	Water. Silt. Silty sand and gravel. Stiff blue clay. Soft blue clay. Coarse sand and gravel, hard stone, boulder or ledge.
39	Surface 14.8	14.8 28.0	Fill. Hardpan.	54	—	—	No rock at depth — 64; surface of yellow clay about — 18.
40	Surface 12.0 16.0 20.0	12.0 16.0 20.0 30.0	Filling. Mud. Clay and fine sand. Hard clay.	55	Start = 16 above water 26.0 30.0 63.0 67.0 84.0	26.0 30.0 63.0 67.0 84.0 —	Air and water. Silt. Fairly stiff blue clay. Fairly stiff blue clay, sand and gravel. Hard blue clay, sand and gravel fill (boulder clay). Rock.
41	Surface 17.0 19.0	17.0 19.0 32.0	Clay fill. Sand and mud. Clay mixed with fine sand.	56	Start 22.0 24.0 51.0	22.0 24.0 51.0 74.0	Water. Silt. Fairly stiff blue clay. Hard blue clay, sand and gravel (boulder clay). Rock.
42	Surface 5.0 38.0	5.0 38.0 50.0	Fill. Fine sand fairly hard packed. Medium hard blue clay.	57	Surface 14.0 18.0 21.0 26.0 52.0 57.0 76.0	14.0 18.0 21.0 26.0 52.0 57.0 76.0 98.0	Sand, gravel and cinders fill. Silt, some sand. Coarse sand. Silt. Hard blue clay. Stiff blue clay. Clay, sand and gravel. Hard blue clay, little sand.
43	Surface 14.0	14.0 26.0	Clay, gravel and sand (apparently filling). Hard clay.				
44	Surface 23.0 30.0 51.0	23.0 30.0 51.0 58.0	Fill. Clay and fine sand. Fine compact sand. Clay.				
45	Surface 4.0 11.0	4.0 11.0 12.0	Fill. Hard clay and rocks. Gravel and rocks, obstruction.				
46	Surface 11.0 19.6	11.0 19.6 38.0	Fill. Fine sand. Clay with little fine sand.				
47	Surface 14.0 16.0	14.0 16.0 30.0	Fill. Mud. Blue clay.				

BORINGS INDICATED ON MAP 3 — *Continued*

No.	From —	To —	Material	No.	From —	To —	Material
58	Surface	14.0	Sand, gravel and cin- der fill.	67	Surface	9.0	Sand and little gravel.
	14.0	34.0	Stiff clay, little sand.		9.0	13.0	Black peat.
	34.0	49.0	Soft blue clay.		13.0	24.0	Sand and clay.
	49.0	68.0	Clay, sand and gravel.		24.0	37.0	Sand and little clay.
	68.0	74.0	Clay, sand and gravel.		37.0	39.0	Sand and little clay.
	74.0	77.0	Clay, very little sand.		39.0	60.0	Soft blue clay.
	77.0	—	Rock.	68	Surface	7.0	Sand and little gravel.
59	Surface	11.0	Blue clay, little sand and gravel fill.		7.0	12.0	Fine blue sand and very little gravel.
	11.0	17.0	Silt shells, very little sand.		12.0	19.0	Clay, little sand.
	17.0	50.0	Stiff blue clay, little sand.		19.0	60.0	Stiff blue clay.
	50.0	59.0	Hard clay, little sand.	69	Surface	5.0	Fine sand.
	59.0	—	Rock.		5.0	7.0	Brick and clay fill.
60	Surface	14.0	Cinders, gravel, sand, back fill.		7.0	12.0	Fairly hard sand, little gravel and little clay.
	14.0	18.0	Black silt.		12.0	16.0	Loose sand, little clay.
	18.0	31.0	Peat.		16.0	22.0	Peat.
	31.0	35.0	Stiff blue clay.		22.0	31.0	Stiff blue clay.
	35.0	38.0	Sand and gravel and clay.		31.0	41.0	Fairly stiff blue clay.
	38.0	—	Rock, probably ledge.	70	Surface	10.0	Sand, gravel and clay.
61	Surface	14.0	Cinders, sand, little gravel fill.		10.0	11.0	Peat.
	14.0	25.0	Black silt.		11.0	19.0	Stiff blue clay.
	25.0	27.0	Peat.		19.0	35.0	Yellow sand, little clay.
	27.0	38.0	Stiff blue clay.	71	Surface	11.0	Sand, gravel, little clay.
	38.0	51.0	Clay and sand.		11.0	17.0	Peat.
	51.0	57.0	Hard clay and sand.		17.0	19.0	Fine blue sand and clay.
	57.0	—	Rock.		19.0	29.0	Stiff blue clay.
62	Surface	10.0	Sand, gravel and clay fill.		29.0	33.0	Fairly blue clay.
	10.0	14.0	Black silt.		33.0	40.0	Little softer clay.
	14.0	19.0	Peat.	72	Surface	13.0	Paving.
	19.0	27.0	Silt with shells.		13.0	10.0	Sand, little gravel and very little clay.
	27.0	45.0	Hard blue clay.		10.0	5.0	Silt and ashes.
	45.0	45.5	Gravel.		5.0	4.0	Sand, little gravel (loose).
	45.5	—	Rock.		4.0	12.0	Peat.
63	Surface	10.0	Clay and gravel and fill.		12.0	18.0	Stiff blue clay.
	10.0	18.0	Clay, sand and very little gravel.		18.0	25.0	Fairly stiff blue clay.
	18.0	38.0	Hard clay, sand and some gravel.	73	+20.0	+18.0	Paving.
	38.0	51.0	Hard clay, sand and muck.		+18.0	+3.0	Sand, gravel, little clay.
	51.0	—	Rock.		+3.0	— 2.0	Silt, little clay.
64	Surface	6.0	Coarse sand and gravel.		— 2.0	—25.0	Sand and clay.
	6.0	30.0	Stiff clay, sand and gravel.	74	+16.0	—14.0	Paving.
	30.0	37.0	Stiff clay, sand and little gravel.		+14.0	+10.0	Sand, gravel and little clay.
	37.0	—	Rock.		+10.0	+6.0	Peat.
65	Surface	17.0	Sand, gravel and clay.		+6.0	—21.0	Yellow sand and clay.
	17.0	25.0	Hard sand, gravel and little clay.		—21.0	—30.0	Blue clay and little sand.
	25.0	30.0	Sand, gravel and clay.		—30.0	—34.0	Fairly stiff blue clay.
	30.0	—	Rock.	75	+19.0	+13.0	Fill.
66	Surface	24.0	Fine yellow sand and little clay.		+13.0	+12.0	Hard fill.
	24.0	30.0	Soft blue clay.		+12.0	+10.0	Fine sand, little clay and gravel.
					+10.0	0.0	Hard clay.
					0.0	— 4.0	Stiff yellow clay and fine sand.
					— 4.0	— 8.0	Stiff yellow clay and little sand.

BORINGS INDICATED ON MAP 3 — *Concluded*

No.	From —	To —	Material	No.	From —	To —	Material
	- 8.0	-12.0	Fine sand, very little clay.		39.0	44.0	Silt and fine sand.
	-12.0	-16.0	Stiff blue clay.		44.0	71.0	Medium soft blue clay.
	-16.0	-24.0	Fine blue gravel, little clay.		71.0	86.0	Medium soft blue clay, little fine sand.
	-24.0	-32.0	Clay, sand, little gravel.				
	-32.0	-35.0	Stiff blue clay and little fine sand.	81	Surface	3.0	Fill.
76	+14.0	+ 8.0	Sand and gravel fill.		18.0	13.0	Yellow clay, little sand and little gravel.
	+ 8.0	+ 6.0	Silty sand and gravel.		13.0	15.0	Peat.
	+ 6.0	+ 5.0	Silty peat.				Stiff blue clay and little sand.
	+ 5.0	+ 9.0	Peat.		15.0	19.0	Stiff blue clay.
	+ 9.0	+14.0	Stiff blue clay.		19.0	28.0	Fair stiff blue clay.
	+14.0	+31.0	Medium blue clay.		28.0	36.0	Fine blue sand, very little clay.
77	+17.0	+15.0	Paving.				
	+15.0	-18.0	Peaty blue clay, then stiff blue clay.	82*	-	-	-
	-18.0	-33.0	Stiff blue clay and little sand.	83	Surface	12.6	Ashes and clay filling.
78	+17.0	+ 6.0	Coarse sand.		12.6	36.0	Fine silty sand and mud.
	+ 6.0	+ 5.0	Coarse sand, little gravel.		36.0	56.6	Loose coarse sand.
	+ 5.0	- 5.0	Fine yellow sand and little clay.	84	Surface	16.5	Fill.
	- 5.0	-21.0	Fine blue sand and little clay.		16.5	21.0	Peat.
	-21.0	-36.0	Stiff blue clay.		21.0	23.5	Fine blue sand, little clay.
	-36.0	-53.0	Medium blue clay.		23.5	29.0	Hard yellow clay, little fine sand.
79	Surface	-11.0	Sand, gravel, little clay fill.	85	Surface	18.6	Fill.
	-11.0	-17.0	Fine sand, little clay fill.		18.6	23.11	Mud.
	-17.0	-32.0	Soft blue clay and sand.		23.11	30.0	Hard packed sand and gravel.
	-32.0	-45.0	Soft blue clay, little fine gravel.	86	Surface	19.0	Fill.
	-45.0	-57.0	Medium stiff blue clay.		19.0	36.2	Mud.
	-57.0	-59.0	Coarse gravel and sand.		36.2	38.0	Sand and gravel.
	-59.0	-	Rock.		38.0	50.0	Hard blue clay.
80	Surface	2.0	Cinders fill.	87	Surface	4.0	Fill.
	2.0	16.0	Clay and sand and gravel fill.		4.0	30.0	Hard yellow clay.
	16.0	27.0	Silt, little fine sand.	88	- 3.5	2.6	Soft silt.
	27.0	39.0	Soft silt, little sand and shells.		2.6	25.0	Medium blue clay.
				89	Surface	21.0	Fill.
					21.0	25.0	Silty sand and mud.
					25.0	37.0	Fine loose sand.
					37.0	59.0	Fine compact sand.
					59.0	65.0	Medium blue clay.

* Boring No. 82, notes only.

BORINGS INDICATED ON MAP 4

NOTE.—Figures preceded by plus or minus signs are elevations referred to Boston datum; otherwise figures are distances in feet from starting point of boring.

No.	From —	To —	Material	No.	From —	To —	Material
1 to 12*	—	—	— —	28	Surface 14.0 19.0	14.0 19.0 26.0	Fill and mud. Sand and gravel. Blue clay.
13	Harbor bottom 3.0	3.0 50.0	Dock mud. Medium blue clay.	29	Surface 11.0 15.0	11.0 15.0 25.0	Soft fill. Soft sand. Medium hard blue clay.
14	Surface 6.6 11.6	6.6 11.6 25.0	Fill. Mud. Hard clay and rocks.	30	Surface 9.6 12.6 17.0	9.6 12.6 17.0 30.0	Fill and mud. Fine sand, very soft clay. Yellow clay. Blue clay.
15 to 17†	—	—	— —	31	Surface 5.0 16.0	5.0 16.0 32.0	Fill. Mud. Clay and fine sand mixed.
18	Surface 13.0 16.0 43.0	13.0 16.0 43.0 51.0	Soft mud. Coarse sand and clay. Clay and little sand. Soft clay.	32	Surface 9.0 25.0	9.0 25.0 29.0	Peat, mud. Loose sand. Soft clay mixed with little sand.
19	Surface 9.0 13.0 18.0	9.0 13.0 18.0 30.0	Fill. Mud. Coarse sand. Hard blue clay.	33	Surface 8.0 30.0	8.0 30.0 55.0	Peat, mud. Fine sand and clay. Soft blue clay.
20	Cellar bottom 14.0	14.0 30.0	Peat, mud. Hard clay.	34	4 borings. bed harbor 8.0	8.0 39.0	Sand. Tough blue clay.
21	Surface 8.0 19.0	8.0 19.0 46.0	Clay fill. Fine silty sand and mud. Fine sand.	35	River bed 20.0	20.0 26.0	Mud. Sand, rocks, clay = hardpan.
22	Surface 12.6 17.6 21.0 25.0	12.6 17.6 21.0 25.0 32.0	Fill. Fine silty sand and mud. Blue clay. Yellow clay. Clay, sand, gravel and rocks.	36	From bottom of test pit 7.0 10.0	7.0 10.0 28.0	Clay and rocks. Sand, mud and rock. Hard blue clay.
23	Surface 12.4 20.0	12.4 20.0 35.0	Fill with trace of mud. Medium blue clay, little fine sand. Hard yellow clay.	37 to 41§	—	—	— —
24	Surface 16.0 18.6 24.4	16.0 18.6 24.4 40.0	Fill. Mud. Sand and gravel. Medium hard blue clay.	42a	+16.0 +10.0 + 3.0 0.0	+10.0 + 3.0 0.0 - 4.0	Clay and gravel. Ash fill. Fine sand. Clay and sand.
25	Surface 2.7 9.0	2.7 9.0 20.7	Fill. Rocks. Hardpan.	42b	+16.0 +11.0 + 8.0 + 4.0 - 1.0	+11.0 + 8.0 + 4.0 - 1.0 - 5.0	Gravel. Fine sand. Peat. Fine sand. Sand and clay.
26‡	—	—	— —	43	—	—	— —
27	River bottom 8.0 18.0 48.0	8.0 18.0 48.0 55.0	Mud. Sand. Soft clay. Hardpan.	44	Surface 10.0 20.0	10.0 20.0 35.0	Fill. Fine silty sand and mud. Medium blue clay.

* Borings Nos. 1-12, inclusive, notes only.

† Borings Nos. 15, 16 and 17, inclusive, notes only.

‡ Boring No. 26, notes only.

§ Borings Nos. 37-41, inclusive, notes only.

|| Boring No. 43, notes only.

BORINGS INDICATED ON MAP 4—*Concluded*

No.	From —	To —	Material	No.	From —	To —	Material
45	Surface 6.0 21.0	6.0 21.0 25.0	Hard packed sand and gravel. Fine compact sand. Hard packed gravel.	226	Surface 7.6 14.6	7.6 14.6 25.0	Fill. Mud. Sand and gravel.
46	Surface 7.0 10.9 20.0	7.0 10.9 20.0 26.0	Clay and gravel fill. Flat mud. Medium yellow clay. Medium blue clay.	227	Surface 5.0 20.0	5.0 20.0 26.0	Fill. Hard clay. Hardpan.
47	+14.5 7.0 11.9 18.0	7.0 11.9 18.0 24.0	Rubbish fill. Very soft peat (very wet) Sharp fine loose blue sand. Medium blue clay and fine sand.	228	Surface 14.0	14.0 22.0	Fill. Sand, gravel and rocks.
48	2 above Grove Street 14.8 19.7 25.0	14.8 19.7 25.0 32.0	Fill. Soft silty sand. Firm coarse dirty sand. Medium blue clay.	229	Surface 10.0 16.0 20.0	10.0 16.0 20.0 29.0	Fill. Peat, mud. Hard packed sand. Clay, sand, rocks.
216	Bottom of pit 10.6	10.6 30.0	Soft fill. Hard clay.	230	Surface 8.0 8.0 14.0	8.0 14.0 27.0	Fill. Soft mud and fill. Hard clay.
217	Bottom of river 6.0 35.0	6.0 35.0 —	Mud. Clay. Rock.	231	Surface 12.0	12.0 27.0	Filling and mud. Hard blue clay.
218	Surface 9.0 37.0 41.0	9.0 37.0 41.0 55.0	Fill. Fine silty sand and mud. Sand and gravel. Soft blue clay.	232	Surface 7.0 10.6 15.0	7.0 10.6 15.0 28.0	Fill. Mud. Sand. Soft clay and little fine sand.
219	River bottom 23.0	23.0 58.6	Fine sand and mud. Blue clay.	233	Surface 8.6 14.0 16.6	8.6 14.0 16.6 33.0	Sand and gravel fill. Peat, mud. Coarse sand. Blue clay.
220	0 17.0 26.0	17.0 26.0 73.0	Fill. Fine sand. Clay.	234	+19.0 +11.0 +2.0	+11.0 +2.0 -9.0	Fill. Hardpan. Clay, sand and gravel fill.
221*	—	—	—	235	+15.0 +3.0 -1.0	+3.0 -1.0 -6.0	Fill. Peat. Sand and gravel.
222	Surface 7.6 9.6	7.6 9.6 25.0	Fill. Mud. Sand, clay and rocks.	236	+12.0 +4.0 +1.0	+4.0 +1.0 -8.0	Fill. Silt. Sandy clay and gravel.
223	Surface 9.0 12.0	9.0 12.0 21.0	Fill. Clay. Clay and rocks.	237	+16.0 +2.0 -1.0	+2.0 -1.0 -9.0	Fill. Peat. Sand and gravel.
224	Surface 16.0	16.0 24.0	Miscellaneous fill. Mud and fine silty sand.	238 to 249†	—	—	—
225	Surface 9.0 14.0 17.0 33.0	9.0 14.0 17.0 33.0 Struck ledge at -89	Clay. —	250	Surface 11.6 21.6 22.0	11.6 21.6 22.0 31.0	Fill. Mud. Sand and gravel. Medium blue clay.
				251	2.6 below top rock 7.5	7.5 33.7 49.8 54.0	Cinder fill. Silty sand and little shells. Silt and fine sand. Coarse sand, gravel and little clay. Medium blue clay.
				252	+16.5 11.0	11.0 15.0	Sand, gravel, clay fill. Hard yellow clay fill, sand and gravel.

* Boring No. 221, notes only.

† Boring Nos. 238-249, inclusive, notes only.

BORINGS INDICATED ON MAP 5

NOTE.—Where plus or minus signs occur the figures refer to Cambridge datum; otherwise figures indicate depths in feet below starting point of boring.

No.	From —	To —	Material	No.	From —	To —	Material
1	+ 16.0 + 1.0 — 9.0 — 14.0 — 100.0 — 110.0	+ 1.0 — 9.0 — 14.0 — 100.0 — 110.0 —	Fill. Silt. Gravel. Blue clay. Boulder clay. Bedrock.	11	Surface 11.0 22.0	11.0 22.0 55.0	Sand and gravel. Soft blue clay and sand. Soft blue clay.
2	+ 19.0 + 9.0 — 1.0	+ 9.0 — 1.0 — 31.0	Fill. Sand. Medium blue clay.	12	Surface 8.0 11.0 22.0	8.0 11.0 22.0 55.0	Fill. Mud. Sand. Soft blue clay and sand.
3	+ 19.0 + 14.0 + 13.0 + 9.0	+ 14.0 + 13.0 + 9.0 — 1.0	Fill. Mud. Sand. Hard blue clay.	13	Surface 6.0 10.0 12.0	6.0 10.0 12.0 32.0	Fill. Mud. Sand. Soft blue clay and sand.
4	+ 15.2 — 7.8 — 11.8 — 19.8 — 27.8 — 31.8	— 7.8 — 11.8 — 19.8 — 27.8 — 31.8 — 32.8	Water. Mud. Sand and silt. Sand and shells. Clay and gravel. Blue shells.	14	Surface 6.0 10.0 28.0	6.0 10.0 28.0 40.0	Fill. Mud. Sand. Soft blue clay.
5	+ 21.50 = Surface 7.7 16.0 16.0 18.7 18.7 19.5 20.3 23.5 23.5	7.7 16.0 18.7 19.5 20.3 23.5 32.0	Sand, gravel and rubbish fill. Soft silt and medium sand. Sharp medium sand. Coarse sand and gravel. Medium blue clay. Hard yellow clay and medium sand. Medium blue clay.	15	Surface 5.0 20.0	5.0 20.0 35.0	Fill. Sand and gravel. Soft blue clay.
6	Surface of water 32.0 37.0	32.0 37.0 43.0	Water and mud. Soft clay. Medium clay.	16	Surface 12.0 13.0 18.0	12.0 13.0 18.0 30.0	Fill. Mud. Sand and gravel. Soft blue clay.
7	Surface 9.10 10.6 10.6 11.8 18.2 18.2 23.2 26.8	9.10 10.6 11.8 18.2 23.2 26.8 30.5	Fill. Peat. Coarse yellow sand, little gravel. Blue clay, sand, little coarse gravel. Coarse gravel, fine gray sand, little clay. Fine gray sand, little fine gravel and clay. Coarse gravel, fine gray sand, little clay.	17	Surface 7.0 18.0 28.0 67.0	7.0 18.0 28.0 67.0 70.0	Fill. Mud. Sand and gravel. Soft blue clay. Soft blue clay and gravel.
8	Street level 17.0	17.0 35.0	Sand and gravel. Hard blue clay.	18	Surface 3.0 20.0 32.0 65.0	3.0 20.0 32.0 65.0 77.0	Fill. Mud. Sand and gravel. Soft blue clay. Soft blue clay and gravel.
9	Surface 13.0 28.0	13.0 28.0 End of hole	Sand and gravel. Soft blue clay and sand. Soft blue clay.	19 to 91*	— — —	— — —	— — —
10	Surface 6.0 30.0 —	6.0 30.0 95.0 —	Sand and gravel. Soft blue clay and sand. Soft blue clay. Rock.	92	Surface 8.0 32.0	8.0 32.0 40.0	Fill. Mud. Coarse sand and rocks.
				93	Surface 10.0 20.0 28.0 32.0	10.0 20.0 28.0 40.0	Fill. Peat, mud. Soft mud. Very soft clay. Clay, sand and rocks.
				94a	Surface 10.0 12.6	10.0 12.6 30.0	Fill. Coarse sand and gravel. Hard clay.
				94b	Surface 4.0 12.0	— — —	Fill. Mud and sand. Clay.

* Borings, Nos. 19–91, inclusive, notes only, relative to bedrock.

BORINGS INDICATED ON MAP 5 — *Continued*

No.	From —	To —	Material	No.	From —	To —	Material
95	Bottom of pit	8.0	Fill.	108	Surface	6.0	Fill.
	8.0	20.0	Peat, mud.		6.0	11.0	Mud and sand.
	20.0	22.0	Fine sand.		11.0	23.0	Fine sand and little clay.
	22.0	32.0	Hard packed sand and gravel.		23.0	40.0	Soft clay.
	32.0	45.0	Soft clay.	109	Surface	12.0	Fill.
96	Surface	7.0	Fill.		12.0	17.6	Coarse sand.
	7.0	10.0	Peat, mud.		17.6	35.0	Hard blue clay.
	10.0	30.0	Fine sand.	110	Surface	5.0	Fill.
	30.0	33.0	Clay.		5.0	20.0	Sand and mud.
97	Surface	16.0	Fill.		20.0	28.0	Sand and gravel.
	16.0	18.0	Mud.		28.0	35.0	Clay.
	18.0	25.0	Coarse sand.	111	— 7.0	—13.0	Gravel.
	25.0	32.0	Medium hard blue clay.		—13.0	—41.0	Blue clay to hardpan.
98	Surface	4.0	Loam.		—	—	Typical for both shores.
	4.0	10.0	Clay and gravel mixed.	112	Surface	9.0	Ashes and fill.
	10.0	20.0	Hard yellow clay.		9.0	26.0	Clay and rocks (hard).
	20.0	40.0	Medium hard blue clay.	113	Surface	6.0	Fill.
99	Surface	2.0	Clay and fine sand.		6.0	15.0	Sand.
	2.0	16.0	Fine sand.		15.0	20.0	Hard clay.
	16.0	20.0	Medium blue clay.	114	Surface	8.0	Fill.
100	Surface	3.0	Fill.		8.0	35.0	Hard brown clay and rocks.
	3.0	8.0	Sand and gravel.	115	Surface	7.0	Fill.
	8.0	25.0	Clay (blue).		7.0	10.0	Brown sand.
101	Surface	8.0	Mud and fill.		10.0	18.0	Gray sand.
	8.0	12.0	Mud.		18.0	25.0	Medium hard blue clay.
	12.0	22.0	Fine sand.	116*	—	—	—
	22.0	29.0	Clay.	117	Surface	6.0	Filling.
102	Surface	11.0	Fill.		6.0	16.0	Mud.
	11.0	21.0	Hard packed coarse sand.		16.0	22.0	Gravel.
	21.0	30.0	Hard blue clay.		22.0	35.0	Fine sand.
103	Surface	3.0	Sand fill.		35.0	40.0	Clay (ends in clay).
	3.0	8.0	Peat, mud.	118	+16.0	+11.0	Sand and gravel.
	8.0	28.0	Sand.		+11.0	+9.0	Peat.
	28.0	50.0	Clay.		+9.0	+2.0	Fine sand.
104	Surface	9.0	Fill.		+2.0	—41.0	Stiff blue clay.
	9.0	13.0	Hard clay.	119 to 125†	—	—	—
	13.0	20.0	Soft blue clay.	126	Surface	13.0	Fill.
105	Surface	14.0	Loose fill and river mud.		13.0	24.0	Medium sand.
	14.0	19.0	Mud.		24.0	60.0	Medium clay.
	19.0	32.0	Sand.		60.0	63.0	Sand, gravel and rocks, little clay.
	32.0	37.0	Soft blue clay.		63.0	67.0	Clay, sand and rocks, struck rock.
106	Surface	1.0	Loamy.	127	Surface	10.0	Fill.
	1.0	8.0	Sand fill.		10.0	20.0	Hard yellow clay.
	8.0	19.0	Peat, mud.		20.0	63.0	Hardpan.
	19.0	30.0	Sand and gravel.		63.0	67.0	—
107	Surface	9.0	Fill.	128	Surface	10.0	Fill.
	9.0	15.0	Sand.		10.0	20.0	Hard yellow clay.
	15.0	24.0	Mud.		20.0	63.0	Medium blue clay.
	24.0	25.0	Soft sand.		63.0	67.0	Clay, sand, rocks and hardpan.
	25.0	27.0	Clay and rocks.				
	27.0	31.0	Clay.				
	31.0	35.0	Clay.				
	35.0	80.0	Clay and sand.				

* Boring No. 116, notes on bedrock.

† Borings Nos. 119–125, inclusive, notes only.

BORINGS INDICATED ON MAP 5 — *Concluded*

No.	From —	To —	Material	No.	From —	To —	Material
129	+21.49 19.0 26.0 37.5 40.7	19.0 26.0 37.5 40.7 45.0	Clay, fill. Silt, little fine sand (good). Medium sand. Fine yellow sand and clay. Medium blue clay.	139	Surface 12.4 25.6	12.4 25.6 38.0	Fill. Compact coarse sand. Medium blue clay.
130	Surface 8.0 18.5 25.0 28.0	8.0 18.5 25.0 28.0 33.5	Sand and gravel fill. Silt and little fine sand. Sharp medium sand and coarse gravel. Hard yellow clay. Medium blue clay.	140	Surface 13.6 18.0	13.6 18.0 27.0	Cinder fill. Silt. Medium coarse sand.
131	Surface 14.0 17.0 28.0	14.0 17.0 28.0 36.0	Fill. Mud and sand. Medium sand. Medium clay.	141	Surface 10.0 20.8 29.5 29.5 31.0	10.0 20.8 29.5 31.0 55.2	Ashes, gravel, fill. Fine silty sand and mud. Hard packed medium sand. Hard yellow clay. Soft blue clay. Rock obstruction, probably boulder.
132	— 3.7 9.5 13.2 17.5	3.7 9.5 13.2 17.5 22.0	Fill. Coarse sand, little fine gravel. Medium blue clay. Fine sand, little clay. Medium blue clay.	142	Surface 9.7 12.8	9.7 12.8 18.7	Ashes and sand, fill and little mud. Sand and gravel com- pact. Fine loose sand.
133	Surface 5.0 14.0 25.0	5.0 14.0 25.0 40.0	Fill. Compact medium sand. Soft blue clay and fine sand. Medium blue clay and layers of sand.	143	River bed 6.0 3.0 19.0 26.6	3.0 19.0 26.6 31.0	Mud. Silty sand and shells. Sharp dirty sand and coarse gravel. Medium blue clay.
134	Surface 14.0 26.0	14.0 26.0 31.0	Fill. Clay and sand. Clay and gravel mixed.	144	—0.35 9.0 32.0 32.0 34.6 34.6	9.0 32.0 32.0 34.6 41.0	Rubbish fill. Soft silt, little fine sand. Sharp dirty sand, little gravel. Fine blue sand, little fine gravel.
135*	—	—	—	145	+21.0 9.0 19.6 22.9 33.3 35.2 37.3	9.0 19.6 22.9 33.3 35.2 37.3 40.0	Fill. Silt with fine sand. Medium yellow clay, little fine sand. Silt, fine sand and shells. Firm dirty sand and gravel. Firm fine blue sand. Medium blue clay.
136	Start 12.0 32.0 40.0 50.0	12.0 32.0 40.0 50.0 52.6	Sand and gravel fill. Coarse sand. Fine sand and gravel, little clay. Coarse sand and gravel. Hard gravel.	146	3.5 below curb 4.6 7.9 11.6 14.3 35.6 37.3 40.0	4.6 7.9 11.6 14.3 35.6 37.3 40.0 44.6	Fill. Firm yellow sand. Medium yellow clay, little fine sand. Medium blue clay, fine sand. Soft blue clay and fine sand. Fine sand. Hard sand, gravel and clay. Hardpan.
137	El. 20.9 6.6 10.0 12.6	6.6 10.0 12.6 25.6	Fill. Soft peaty mud and very little fine sand. Hard blue clay. Hard yellow clay.				
138	El. 21.0 13.0 23.6 25.6 32.6	13.0 23.6 25.6 32.6 52.6	Miscellaneous fill. Silt and shells. Medium blue clay and little gravel. Hard yellow clay. Medium blue clay, little fine sand.				

* Boring No. 135, notes only.

OF GENERAL INTEREST

PROCEEDINGS OF THE SOCIETY

JOINT OUTING, NEW ENGLAND WATER WORKS ASSOCIATION AND BOSTON SOCIETY OF CIVIL ENGINEERS

The regular meeting of the Boston Society of Civil Engineers was omitted in June in order to join with the New England Water Works Association in an outing which was held at the Sandy Burr Country Club, Wayland, on June 23, 1931.

A program of sports and stunts, games of bridge and golf, and the dinner provided enough variety to please all. About two hundred and thirty members, ladies and guests attended.

The committees in charge were George C. Brehm, Chairman, Raymond Simons, Ralph Kelley, of the New England Water Works Association and Everett N. Hutchins, Richard C. Sherman, Edward S. Averell (in charge of Field Sports), John J. Campobasso (in charge of registration and tickets) and Donald MacDonald, of the Boston Society of Civil Engineers.

APPLICATIONS FOR MEMBERSHIP

[Sept. 20, 1931]

THE By-Laws provide that the Board of Government shall consider applications for membership with reference to the eligibility of each candidate for admission

and shall determine the proper grade of membership to which he is entitled.

The Board must depend largely upon the members of the Society for the information which will enable it to arrive at a just conclusion. Every member is therefore urged to communicate promptly any facts in relation to the personal character or professional reputation and experience of the candidates which will assist the Board in its consideration. Communications relating to applicants are considered by the Board as strictly confidential.

The fact that applicants give the names of certain members as reference does not necessarily mean that such members endorse the candidate.

The Board of Government will not consider applications until the expiration of fifteen (15) days from the date given.

For Transfer from Grade of Junior

COCHRANE, EARLE SEYMOUR, Cambridge, Mass. (Age 26, b. Cambridge, Mass.) Graduate of Northeastern University. Has been in the employ of the Department of Public Works, Commonwealth of Massachusetts, since 1926, as instrumentman from June, 1926, to July, 1927; chief of survey party from July, 1927, to date. Refers to *H. B. Alword, Erwin Harsch, Channing Howard, W. E. Nightingale.*

CUSTER, WILLIAM CLARKE, Arlington, Mass. (Age 27, b. Somerville, Mass.) Graduate of Tufts College, with degree of B.S. in civil engineering, in 1926. While in college worked two summers (1924 and

1925) for State Department of Public Works. After graduation was with Highway Commission during summers of 1926 and 1927; from August, 1926, to May, 1927, was employed by the Concrete Steel Company, in Boston office, as structural designer and draftsman; in August, 1927, in same capacity with Barker Steel Company; in August, 1928, was employed by the New England Power Association as drafting production supervisor until February of this year. Due to an abrupt drop in construction the necessity for a production system became less and less important, until February, 1931, he began designing and drafting of various steel and concrete structures in connection with electrical substations and hydro-electric generation stations, on which he is now occupied. Refers to *H. P. Burden, W. F. Covil, C. M. Durgin, F. N. Weaver.*

DOWNER, WILLIAM JOHN, Springfield, Ill. (Age 27, b. Charlestown, Mass.) Education: Tufts College Engineering School, 1922-26; Harvard Graduate School of Sanitary Engineering, 1926-27; Massachusetts Institute of Technology, June-July, 1929; third Public Health Institute. Summer of 1924, rodman, Metropolitan Sewerage Works; summer of 1926, with Massachusetts Public Health; from August, 1927, to date, assistant sanitary engineer with Illinois Public Health Department. Refers to *H. P. Burden, G. M. Fair, A. D. Weston, Edward Wright.*

MALKOWSKI, PETER CHARLES, Salem, Mass. (Age 26, b. Salem, Mass.) Graduate of Northeastern Polytechnic Institute as civil engineer in 1927; received diploma in structural engineering from this institute in 1928. Took special courses in foundations and hydraulics at Lincoln Institute, 1930-31. Experience: Massachusetts Department of Public Works as engineering assistant and draftsman from June, 1927, to June, 1928; Pennsylvania State Highway as draftsman and computer in June, 1928; Massachusetts Department of Public Works, July, 1928, to February, 1929; with Stone & Webster Engineering Corporation as concrete and hydraulic draftsman and concrete designer from March, 1929, to March, 1931; Massachusetts Department of Public

Works from April, 1931, to date. Refers to *H. B. Alword, A. B. Appleton, C. O. Baird, C. S. Ell, H. F. Heald.*

MELLOR, FREDERICK, New Bedford, Mass. (Age 26, b. New Bedford, Mass.) Graduate of Northeastern University in 1926. Surveying with A. B. Drake, 1923-25; N. Y., N. H. & H. R.R., maintenance of way, 1925-29; Stone & Webster Engineering Corporation, 1930 to date. Refers to *H. B. Alword, C. O. Baird, A. B. Drake, W. E. Nightingale.*

NEIL, DEXTER S., Lowell, Mass. (Age 26, b. Lowell, Mass.) Graduate of Northeastern University in 1926. During co-operative periods was employed by Whitman & Howard from 1922 to 1925, and by Turner Construction Company, from 1925 to 1926, as material clerk, time-keeper, and as assistant superintendent on building construction from 1926 to 1931; with the town of Canton as engineer, 1931. Refers to *C. S. Ell, Channing Howard, D. W. Lavers, W. E. Nightingale.*

PILLSBURY, ARTHUR MILLIKEN, Berkeley, Calif. (Age 27, b. Scarborough, Maine.) Graduate of Northeastern University in 1926 with degree of B.C.E. From June, 1926, to January, 1927, was draftsman with D. P. Robinson & Co.; March, 1927, to September, 1929, transitman with C. H. Tenney & Co.; February, 1930, to April, same year, surveyor with Standard Appraisal Company of San Francisco; April, 1930, to September, transitman with Pacific Gas & Electric Company; October, 1930, to April, 1931, draftsman with Thebo, Starr & Anderton of San Francisco. At present unemployed. Refers to *H. B. Alword, C. O. Baird, A. J. Harty, W. E. Nightingale.*

ROBERTS, ALBERT ARTHUR, Winchester, Mass. (Age 28, b. Wilmington, Mass.) Graduate of Northeastern University in June, 1929. After graduation continued work with Henry F. Bryant & Son, with whom he had been employed during his entire course at college. Up to the present time rated as chief of party, doing general engineering work which covers surveying and topographical work, also land court calculations, estimates, developments and a fair amount of mapping. Refers to *H. B. Alword, C. O. Baird, W. A. Bryant, C. S. Richardson.*

ROBINSON, EARL CLAY, Tela, Honduras, C. A. (Age 26, b. Concord, N. H.) Graduate of Northeastern University in June, 1928. Employed by Whitman & Howard during his college experience, and after graduation worked with the same firm until November, 1928. Entered the employ of the Tela Railroad Company in November, 1928, and is still with them. Refers to *T. F. W. Dunn, Channing Howard, W. E. Nightingale, L. H. Smith.*

ROMMER, GEORGE J., Winthrop, Mass. (Age 27, b. Chelsea, Mass.) Had three years at Northeastern University (1921-23) and one year at Northeastern Polytechnic (1927). From 1924 to 1928 on sewer construction with the Metropolitan District Commission; with State Department of Public Works in 1928 on road construction, and at present is a junior civil engineer in charge of construction of Clover-Leaf Intersection at Boston-Worcester Turnpike and southerly connection in Northborough, Mass. Refers to *A. E. Colvin, R. W. Loud, Benjamin Rubin, H. T. Stiff.*

SOUTHWORTH, EDWIN W., Jr., Worcester, Mass. (Age 28, b. Winchester, Mass.) Graduate of Massachusetts Institute of Technology, class of 1926. From October, 1926, to June, 1927, rodman with Metropolitan District Water Supply Commission; instrumentman from June, 1927, to June, 1930; and 1930 to date, assistant engineer. Refers to *C. L. Coburn, K. R. Kennison, C. C. McCully, F. E. Winsor.*

STIMPSON, CHARLES H., Jr., Weston, Mass. (Age 27, b. Weston, Mass.) Graduate of Northeastern University in 1927. During his co-operative periods was with Roland H. Barnes in Waltham, and since graduation until July, 1930, was with Mr. Barnes as transitman and chief of party; to date is doing business for himself as engineer and surveyor. Refers to *F. C. Bell, R. W. Coburn, F. L. Preble, W. E. Wheeler.*

SULLIVAN, BENJAMIN EUGENE, Wollaston, Mass. (Age 28, b. Quincy, Mass.) Graduate of Franklin Union. Four years evening course in structures and building construction. With A. L. Smith Iron Works from May, 1921, to date, drafting, estimating and designing. Refers to *O. D. Chiesa, H. A. Gray, A. L. Wannlund, A. O. Wilson.*

URQUHART, JAMES WALTER, Worcester, Mass. (Age 28, b. Waltham, Mass.) Graduate of Northeastern University, 1927. With R. H. Barnes and Henry F. Beal from 1923 to 1927, and from 1927 to date in the engineering department, city of Worcester. Refers to *C. S. Ell, R. N. Mayall, W. E. Nightingale, L. T. Schofield, E. O. Stearns.*

WITHERELL, ROGER G., Taunton, Mass. (Age 31, b. Taunton, Mass.) Graduate of Northeastern University in 1927. Since graduation has been employed by G. H. Fuller Construction Company, 1927; town of Falmouth, Water Department, part of 1927; from July, 1927, to date has been employed by Chas. T. Alger, general contractor, Taunton, in the capacity of engineer, estimator and superintendent of construction. Refers to *Luther Dean, C. S. Ell, A. C. King, W. E. Nightingale.*

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DEATHS

- ALGER A. CONGER . . . May 26, 1931
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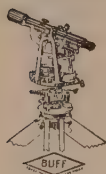


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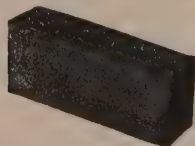
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Subsoils of Boston

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IRVING B. CROSBY
HEYWOOD S. FRENCH

CHARLES D. KIRKPATRICK
CHARLES W. ROBINSON

ALBERT C. TITCOMB

Social Activities

RICHARD W. SHERMAN, *Chairman*

CHARLES W. ANDERSON
JOHN J. CAMPOBASSO
JACOB GINSBURG
KENNETH H. GILSON
EDWARD S. AVERELL

RICHARD H. HAMILL
ROBERT W. PERRY
KENNETH D. SYLVESTER
MERTON E. SYLVESTER
ROBERT H. VERNER

Membership and Publicity

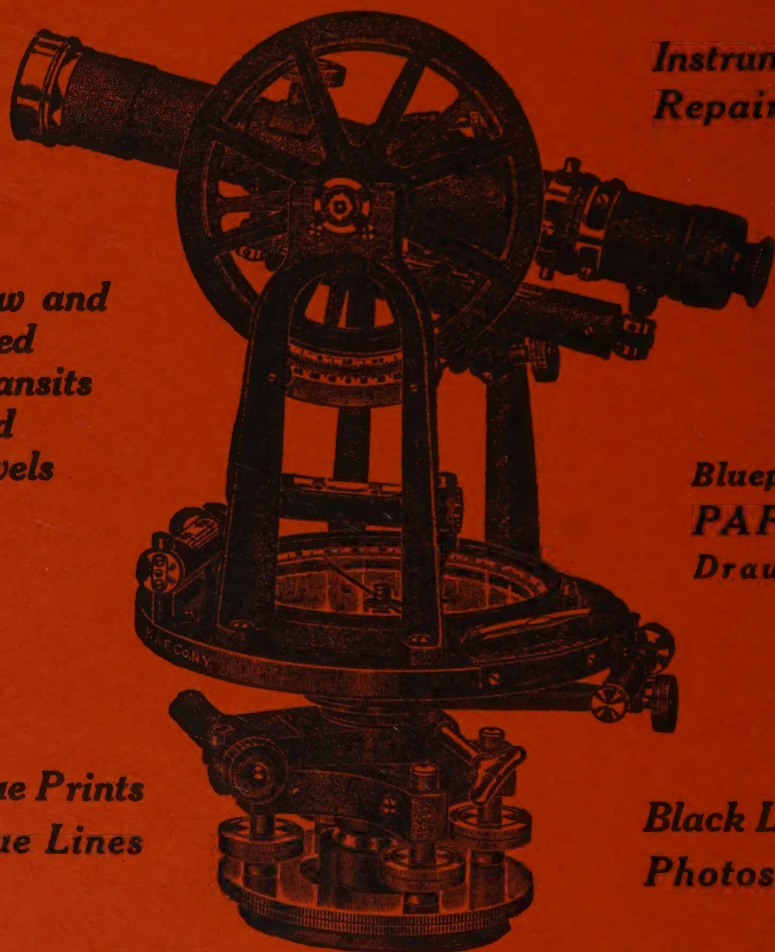
ARTHUR L. SHAW, *Chairman*

WILLIAM F. DONOVAN
WILLIAM H. ELLIS
ARTHUR J. HARTY
HAROLD F. HEALD

LE ROY M. HERSUM
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